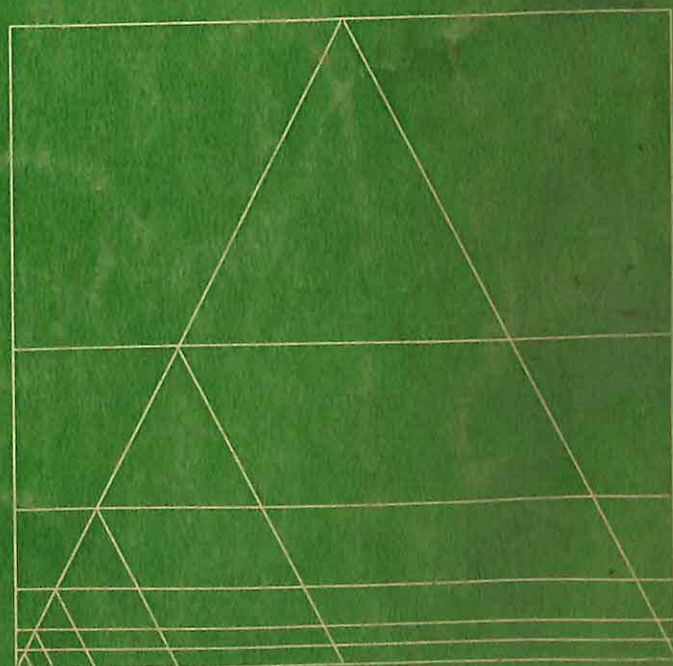
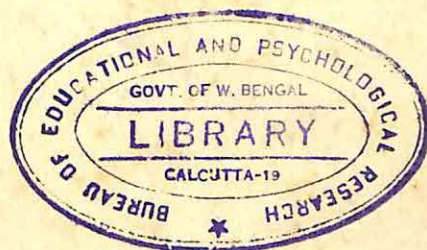


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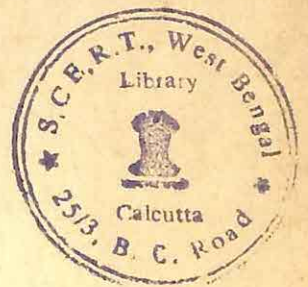




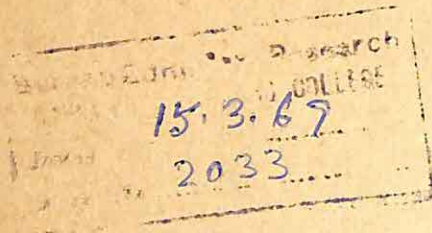
An Asian Model of educational development: perspectives for 1965-80

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An Asian Model of educational
development

Perspectives for 1965-80



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S.C.E.R.T., West Bengal

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Introduction

The Ministers of Education of Asian Member States met in Tokyo in April 1962 and, after reviewing the progress made in the implementation of the Karachi Plan for free and compulsory education of a minimum of seven years' duration, decided that the plan should be extended to cover all levels of education. The meeting requested Unesco in co-operation with ECAFE to aid Member States in the task of 'establishing long-term educational perspective plans and in putting together these national plans into a draft Asian Model which we will examine when we meet again in December 1965'.

In response to this request, Unesco appointed five consultants from Member States in Asia who, with the technical aid of the Secretariat, both from Headquarters and from the Regional Office for Education in Asia (Bangkok) and ECAFE, prepared a document, 'Perspectives of Educational Development in Asia: a Draft Asian Model', which was considered and examined by the Conference of Ministers of Education and Ministers responsible for Economic Planning of Member States in Asia, held at Bangkok in November 1965. The conference recommended that the document be published after incorporation of the revisions, amendments and alterations suggested by the conference. The present publication is the revised version prepared by the Unesco Secretariat.¹

The purpose of this document is threefold: first, it is an attempt to visualize in quantitative terms the prospectives of educational development in Asia until 1980 taking into account the past and present situation. Secondly, it is designed to illustrate the interrelationship of some of the main factors involved in educational development and to show how they may be viewed in different combinations. Thirdly, it seeks to draw attention to some of the important implications for educational development that become evident when specific data are examined systematically and quantitatively as has been done in the Model.

The main innovation in the Model is the methodological approach. The methodology is not intended primarily for targets but for quantifying various educational hypotheses commonly considered by planners. It is placed at the disposal of the policy-makers who determine educational assumptions, and would show the quantitative implications of these assumptions, thereby contributing to an understanding of the complex inter-relationships between variables. The main methodological concept is to regard school education as a system through which a flow of people proceed from grade to grade and type to type. In this context it is noted that the use of modern computers gives more flexibility by allowing quantification of policy alternatives not only for a target year of levels of education but also for all grades and types of education, all intermediate years being shown. Thus the results obtained as outputs are not definitive but reflect the quantitative effect of the educational hypotheses upon the input data used.

It is recognized that the methodological quantification of a series of educational hypotheses and elements is in itself no substitute for educational planning, the Model being a tool for the planners which frees them for the more creative task of analysing and revising their original hypotheses in the light of the results of the exercise.

1. This publication refers to Member States which are participating in the Karachi Plan and terms used in it, 'Asian region', 'countries of the region' and 'region' are to be construed accordingly. The Member States concerned are the following: Afghanistan, Burma, Cambodia, Ceylon, Republic of China, India, Indonesia, Iran, Republic of Korea, Laos, Malaysia, Mongolia, Nepal, Pakistan, Philippines, Singapore, Thailand and Republic of Viet-Nam. The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Unesco Secretariat concerning the legal status of any country or territory, or of its authorities, or concerning the delimitations of the frontiers of any country or territory.

It is believed that the methodology used in the Asian Model can be adapted to fit the particular situations of individual countries and would make it possible to incorporate other variables which are relevant for national planning provided data are available. An important advantage of this methodology is that it permits the acceleration of the analytical process, thus allowing more time for necessary re-evaluation of alternatives for policy decisions.

A methodology thus conceived represents a distinct improvement over *ad hoc* quantification, an approach used in the past. Thus it includes a set of equations which reflects the basic interdependence of the educational system as a whole. It makes it possible to use computers

to solve such equations. But it does not answer questions, and it will still be for educational planners to formulate alternative hypotheses and to set objectives.

In addition, the systematic collection, compilation and analysis of the essential data needed for the application of the methodology proposed will call for a considerable effort. Furthermore, there remain many factors, notably of a 'qualitative' nature, that cannot, at present, be adequately quantified. As research progresses and these factors are identified quantitatively they can be included in the Model.

The Model represents a tool that can simulate the dynamics of future consequences of change in any quantitatively defined conditions affecting the educational system.

Chapter 1

Background

In the following paragraphs a brief account of the general features of the demographic, economic and social situation in the region is presented to serve as background against which the needs and prospects of educational development in the coming years may be viewed.¹

Demographic

The outstanding characteristic of the region is the massive size of its population: in 1964 it was estimated at 913 million. In the 1950s the rate of growth of the total population of the region doubled, rising from about 10 per cent every ten years before 1950 to nearly 20 per cent between 1950 and 1960. If the over-all rate of population increase continues its accelerating trend, as provisional projections seem to indicate, the population will nearly double in the period 1960–2000, contrasted with an aggregate increase of about 60 per cent in the immediately preceding forty-year period.

One of the important aspects of rapid population growth is its effect on population density.

The density of population varies over a wide range in the region. The number of persons per square kilometre of arable land is between 120 (in Iran) and 1,200 (in the republics of China and Korea), the regional average (311) being higher than in any other continent. This variety of situations with regard to the density of population is to be borne in mind in view of its implications for development plans and policies.

Table 1 shows population per square kilometre of total land area and of area of arable land (1960) and the annual rate of population growth during 1950–60 for some countries in the region.

Recent population censuses and other new data indicate that the high rate of population increase is the

result of large reductions in mortality while birth-rates remain high. Achievements in these countries in the field of mortality reduction are without precedent in the ex-

TABLE 1. Estimated annual rates of population growth, 1950–60 and population density in 1960

Country	Annual rate of population growth (%)	Persons per square kilometre of total area	Persons per square kilometre of arable land and land under permanent crops
Afghanistan	1.8	22	160
Burma	1.9	33	257
Cambodia	3.2	32	238
Ceylon	2.3	151	643
China, Republic of	3.4	294	1 220
India	1.9	142	240
Indonesia	2.1	63	533
Iran	2.2	12	120
Korea, Republic of	1.9	250	1 225
Laos	3.2	8	180
Malaysia ¹	2.9	53	316
Mongolia	1.9	1	—
Nepal	1.4	65	236
Pakistan	2.1	98	314
Philippines	3.1	90	410
Singapore	4.8	2 759	11 429
Thailand	3.1	51	262
Viet-Nam, Republic of ²	3.4	83	486

1. Figures refer to Federation of Malaya.

2. For 1958–63. Data taken from: United Nations, *Demographic Yearbook*, 1964, New York, 1965, p. 103.

Source. ECAFE, *The Demographic Situation and Prospective Population Trends in Asia and Far East*. October 1963. Secretariat paper for Asian Population Conference. Except where otherwise noted.

1. In the tables in this document where the data were gathered prior to the formation of Malaysia, they have been given for the Federation of Malaya or Sabah and Sarawak according to the availability of data. The following symbols may occur in some tables:

- ... Data not available
- Magnitude nil or negligible
- Category not applicable

perience of the Western world. In spite of considerable gaps in knowledge on the demography of many Asian countries, it is apparent that some of the highest birth-rates in the world may be found in Asia. Excluding Japan, there seems to be in the rest of Asia a picture of fertility having remained without much appreciable change over a considerable period of time and there is no sign yet of fertility declines having begun. Family planning programmes have been launched recently by some countries of the region but it is still too early to assess their success.

The population problems of Asian countries arise from the rapid rate of population growth that is bound to continue during the long interval before a new balance of low death-rates and low birth-rates is attained. This rapid population growth is of special significance for economic development generally, and for the development of education in particular.

The result of a high birth-rate is transmitted directly to the age structure of the population. While over 40 per cent of the Asian population are under 15 years of age, this proportion is only about 32 per cent in Northern America and 26 per cent in Europe. With the school-age population of the region (6-21) constituting about 36 per cent of the total, the education systems of Asian countries have a much heavier load to carry.

Table 2 shows the age structure of the population in specified Asian countries as compared with that of a few economically developed countries outside the region.

TABLE 2. Age structure of the population (latest year available)

Country	Year	Age (percentage distribution)			
		All ages	Under 15 years	15-59 years	60 years and over
Burma	1960	100	41.3	53.5	5.2
Cambodia	1959	100	44.7	51.3	4.0
Ceylon	1961	100	40.7	54.0	5.3
China, Republic of	1960	100	45.1	50.7	4.2
India	1961	100	41.1	54.1	4.8
Indonesia	1961	100	42.1	53.8	4.1
Iran	1956	100	42.2	52.2	5.6
Korea, Republic of	1960	100	43.3	51.4	5.3
Malaysia ¹	1957	100	43.8	51.6	4.6
Pakistan	1961	100	44.5	49.5	6.0
Philippines	1960	100	45.7	50.0	4.3
Singapore	1957	100	42.8	53.4	3.8
Thailand	1960	100	43.2	52.2	4.6
<i>Economically developed countries outside the region:</i>					
France	1960	100	25.6	57.1	17.3
United Kingdom	1960	100	22.8	60.0	17.2
United States	1960	100	31.1	55.7	13.2

1. Figures relate to Federation of Malaya.

Source. ECAFE, *The Demographic Situation and Prospective Population Trends in Asia and Far East*, op.cit.

Because of the demographic structure of the countries in the region, the dependency rate is high and the total and *per capita* production tends to be lower. This makes the task of economic development much more complex. The unfavourable age structure of the population means necessarily the supporting of a great number of children who cannot be expected to contribute to active production and who are entitled to special attention in the consumption of the products of their economies. One of the unfortunate consequences of this heavy burden of child dependency is that children are compelled to enter the labour force prematurely.

When population is growing very fast, a large part of the capital accumulating has to be used just to maintain the growing population at the same standard of living, leaving little margin for its improvement. It has been shown that the higher the rate of growth of *per capita* income desired, the higher must be the rate of increase in investment. Conversely, given the desired rate of growth in *per capita* income, the higher the rate of population growth, the higher would have to be the rate of increase in investment.

Urbanization is growing rapidly in most of the Asian countries. Although the urban population is still a small proportion of the total population, it has in recent years increased at a rate about twice that of over-all population growth, and since the cities that were already large have tended to grow fastest of all, it has put a heavy strain on the organization of economic and social services. While data are not available to distinguish precisely the growth in urban population due to natural increase from that arising out of rural in-migration, there can be no doubt that movements of people from rural areas account for a large proportion of the increase in urban populations. It is becoming increasingly important to take account of this rapid pace of urbanization in the formulation of the national development plans and in assessing future educational needs.

The United Nations estimates indicate the very large increase that will occur in the population of Asian countries unless there is an immediate and very marked decline in fertility. The projections used for the document¹ show that the total population of the region is expected to rise from 824 million in 1962 to 1,370 million by 1980. The rate of growth would be 2.6 per cent in the sixties, declining only slightly in the seventies to 2.57 per cent.

The consequences for educational development of a high rate of population increase and its economic implications are obviously important. But the contribution of education, including adult education, to population

1. See Appendix A.

restraint can be equally significant. While the relationships between increased education and successful family planning have not yet been fully unravelled, there seems good reason to believe that education, and in particular the education of girls and women, is one of the factors that may significantly contribute to creating the conditions necessary for population control.

Economic

Rapid economic development has been accepted in the developing countries in the Asian region as the crucial issue of contemporary times. After the Second World War, the political aspirations of these countries found their fulfilment in the attainment of independence and, preoccupied though they were in consolidating their political institutions, they addressed themselves almost simultaneously to the tasks of breaking the stranglehold of economic stagnation of the preceding period and achieving an accelerated economic growth. The revolution of rising expectations and the mounting pressures to attain as rapidly as possible the levels of economic and social well-being of the already developed countries were reflected in the adoption of development planning as an instrument of policy. Most countries now have planning commissions or agencies undertaking the first steps towards guiding, stimulating, co-ordinating and, where necessary, controlling an intricate network of national decisions with a view to achieving rapid economic and social transformation.

The development plans have set national and sectoral goals, outlined priorities, allocated resources, and suggested the changes in the administrative machinery to cope with the new tasks. The actual performance of the economies is being assessed against the objectives set and policies are being refashioned to overcome obstacles as they become known through experience.

The fifties marked the first break-through in the long-term stagnation of the Asian region. The annual rate of increase in the gross domestic product in the region was 2.0 per cent from 1938 to 1948. With 1.2 per cent annual increase of population, *per capita* produce increased only by 0.8 per cent per annum. In the fifties the economies of the region showed an average annual growth rate of over 4.2 per cent which stands out in sharp contrast to the record of preceding decades. The average annual growth of gross national product (GNP) *per capita* amounted to 2.1 per cent (Table 3).

The national product of the countries, measured in 1960 prices and converted at current exchange rates, rose

TABLE 3. Average annual percentage rates of growth of gross national product, population and *per capita* income (latest available period)

Country	Year	Gross national product	Population	<i>Per capita</i> gross national product
Burma	1952-64	4.8	2.0	2.6
Cambodia	1952-63	5.8	3.6	2.2
Ceylon	1951-64	3.1	2.5	0.5
China, Republic of	1951-64	8.1	3.5	4.5
India	1951-64	3.9	2.1	1.8
Indonesia	1951-60	3.3	2.1	1.1
Korea, Republic of	1953-64	4.9	2.4	2.3
Malaya, States of	1955-64	4.8	3.2	1.6
Pakistan	1951-64	3.5	2.1	1.3
Philippines	1951-64	5.4	3.1	2.2
Thailand	1951-64	6.1	3.0	2.9

Source. ECAFE Economic Survey of Asia and the Far East, 1965. Part 1: Economic Development and Human Resources, Bangkok, 1966.

TABLE 4. *Per capita* gross domestic product at factor cost, 1963¹

Country	U.S.\$	Country	U.S.\$
Burma	65	Sabah	219
Cambodia	111	Sarawak	192
Ceylon	129	Nepal	67
China, Republic of	154	Pakistan	86
India	78	Philippines	134
Iran	224	Singapore	449
Korea, Republic of	113	Thailand	104
Malaysia:		Viet-Nam, Republic of	97
States of Malaya	254		

1. *Per capita* gross domestic product in national currencies from national sources converted into U.S.\$ at official exchange rates.

Source. ECAFE Economic Survey of Asia and the Far East, 1965. Part 1: Economic Development and Human Resources, op.cit.

from \$46 billion in 1950 to about \$70 billion in 1960 and may well be around \$85 billion for 1965.

Table 4 shows *per capita* gross domestic product for selected countries of the region. It has, however, to be borne in mind that among economists it is now widely recognized that the current exchange rates are but poor indicators of the national differences in real purchasing power and it would be necessary to adjust the current estimates upwards to reflect the differences in relative price levels.

These developments in the fifties have brought about a number of significant changes in the Asian economies.

Gross capital formation, one of the major determinants of growth, has risen from 11 per cent of GNP in 1950 to

TABLE 5. Gross domestic savings and gross capital formation as percentages of gross domestic product, 1950, 1955, 1960 and 1963

Country	1950		1955		1960		1963	
	Gross domestic savings	Gross capital formation	Gross domestic savings	Gross capital formation	Gross domestic savings	Gross capital formation	Gross domestic savings	Gross capital formation
Burma	13.3	9.2	21.3	20.5	14.5	17.4	20.7	20.3
Ceylon	16.4	9.5	16.9	10.7	10.8	14.1	12.1	14.5
China, Republic of	—	—	11.5	15.3	14.0	21.7	18.4	19.2
India	10.8	10.5	14.7	15.1	—	17.7	—	—
Korea, Republic of	—	—	8.6	12.2	10.2	10.1	14.6	20.2
Malaya, States of	—	—	18.9	9.5	20.0	14.3	16.0	18.5
Philippines	14.2	8.5	6.0	8.9	9.4	9.8	17.2	13.2
Viet-Nam, Republic of	—	—	—	—	13.0	12.5	7.1	7.6
Thailand	—	—	—	16.3	—	16.6	—	22.1

Source. United Nations, *Yearbook of National Account Statistics*, and national sources, in: ECAFE, *Economic Survey of Asia and the Far East*, 1965, op.cit., Part II.

nearly 17 per cent in recent years, though in individual countries the trend is marked by fluctuations from year to year. Although external assistance has increased, domestic savings have moved up more or less in line with the gross capital formation (see Table 5). If the trend continues, the share of capital formation in GNP could rise to 20 per cent or above in another ten years.

The countries in the region started from a very low industrial base, but assisted by an active industrial development policy, the post-war rate of industrial growth has been significantly high. Industrial output has nearly trebled and the progressive shift in the structure of output—away from agriculture and towards other rapidly developing sectors—has already begun. Manufacturing production which in the period 1938-48 was growing at a slow rate of 1.2 per cent per annum increased by 4.5 per cent per annum in the period 1948-53 and 10 per cent during 1953-64. By broad commodity groups, the fastest increase in manufacturing production was in metal products (17 per cent per annum in 1953-64) followed by paper and paper products (15 per cent), chemicals (12 per cent), non-metallic products (11 per cent) and basic metals (11 per cent). The difference in the rate of expansion in various industries reflected a shift from light manufacturing to heavy manufacturing.¹

Electricity and gas production increased at an even faster pace than manufacturing, about 12 per cent per annum for 1948-64, and production in 1964 was six times that of 1948.

Reflecting the new importance of the public sector as the principal means of stimulating economic and social development, its share has arisen from around one-eighth to about one-fifth of the total national expenditures, and from around one-third to as high as two-thirds of national fixed investments.

In a region as vast and complex as Asia, these averages can only partially portray the developments in individual countries. As is to be expected, the advance was fast in some countries and slow in others, the annual growth rate of national product ranging from a low of 3 per cent to a high of 8 per cent. It was rapid in the small countries and slow in the big ones. Three of the largest of the ten countries for which data are available, accounting for nearly three-quarters of the total output, raised their national income by only about 3.8 per cent per year against 5.5 per cent for the other seven. It follows therefore that if these countries succeed in stepping up their development, the over-all outlook for the region would be significantly improved.

To a large extent, the differences in growth reflect the performance in two crucial areas, agriculture and export. The weight of the agricultural sector in the economies of the countries of the region is so large that its slow growth tends to depress the growth of over-all national product. Table 6 shows the sector shares in gross domestic product and employment (for 1961 or the nearest year for which data are available) and stresses the crucial place that agriculture still has in the economies of the countries.

In the period 1934-52, agricultural production in the region increased only by 4 per cent and food production by 6 per cent. With a population increase of 19 per cent that took place during the period, *per capita* agriculture production was reduced by 15 per cent. In the period 1948-60, agricultural production showed a distinct improvement, increasing by 3.2 per cent per annum and food production increased by 3.4 per cent per annum. Population increased on an average by 1.9 per cent per annum and *per capita* food output gained by 1.4 per cent.

1. ECAFE, *Economic Survey of Asia and the Far East*, 1965, op. cit.

TABLE 6. Sector shares in gross domestic product and employment, 1961 (or nearest available year) (percentage of total)

Country	Gross domestic product			Employment ¹		
	Agricul- ture	Industry sectors	Other sectors	Agricul- ture	Industry sectors	Other sectors
Burma	43	18	38	...	...	...
Cambodia	41	12	46	...	...	...
Ceylon	46	15	39	53	9	38
China, Republic of	31	25	44	55	16	28
Indonesia	56	11	34	72	8	20
India	46	17	37	74	11	15
Iran	27	32	41	56	20	24
Korea, Republic of	42	19	38	...	...	...
Malaya, Federation of	44	11	45	59	12	29
Nepal	...	...	...	94	2	4
Pakistan	56	13	28	75	9	16
Philippines	34	20	46	61	15	24
Singapore	...	...	...	9	20	72
Thailand	39	19	42	82	4	14
Viet-Nam, Republic of	30	12	58	...	...	...

1. Employment data are unrefined owing to difference among countries in coverage and definitions.

Source. *Economic Bulletin for Asia and the Far East*, New York, United Nations, June 1965.

In 1961-62 and 1962-63 agricultural and food production slackened to annual rates of 1.5 and 0.2 per cent respectively, while population accelerated its annual growth rate to 2.5 per cent. Better progress was achieved in 1963-64 and 1964-65 with rates of 3.7 and 6.8 per cent respectively for food production and 3.7 and 5.7 per cent for all agriculture.

Agriculture supplies 35 to 98 per cent of the total exports from the region. The dependence of these countries on the exports of traditional primary products led to relatively limited increases in export proceeds, thus placing severe limitations on their ability to finance the imports of rapidly rising requirements of capital and other intermediate goods and of essential consumer goods.

Building on past experience, the countries have set ambitious goals. According to the combined estimates of existing plans, the region may increase output at 6.5 per cent per year—or to nearly three and a half times in twenty years and to twelve times in forty years. The present low level of *per capita* income could, as a result, rise about two and a fifth times in twenty years and nearly seven to nine times in fifty years, or to recent levels in the industrial countries. Implicit in the national perspectives are thus ambitious goals of an economic and social transition of the continent.

But setting the goals is not enough. Measures to attain them are crucial, as the experience of the last decade has

emphasized. If only past trends are to continue, the growth rate of the developing economies in the region may well fall below the targets of national development plans.

For the region as a whole the export prospects are none too favourable and they will therefore impose the necessity, if the goals are to be realized, of a major re-assessment of a number of policies so far pursued; the composition of imports will have to be more carefully managed if the supplies of capital goods needed for an enlarged volume of investment are to be assured; external assistance on a much larger scale, depending upon the performance of the export sector and its wise and efficient utilization, will be called for; domestic resources, particularly an increasing share of the growing income, will have to be devoted to investment; a more rapid substitution for imports, through a faster development of both agriculture and industry and resources of skilled manpower, will have to be undertaken; administrative and other non-development expenditures need to be watched; in guiding the allocation of investments, a careful weighing of costs and benefits will be called for; the full benefits of regional economic co-operation remain to be explored and utilized; and above all, even where the development policies are not altogether inadequate, the obstacles to their implementation still remain to be tackled.

A mere listing of some of the requirements adds up to major departures from past policies. But planning is a purposive activity; antecedent circumstances do not mercilessly shackle it, but merely set some upper and lower limits to its operations. Discussions at the national levels have indicated a full awareness of the need for these changes.

Social

On the social as on the economic front, the period of planned development in Asia has been characterized by significant but uneven progress, with advances in certain directions being reduced or sometimes offset by the sharpening of old problems or the appearance of new ones.

Although national wealth, as measured by conventional economic indicators, has risen appreciably in the region as a whole, some countries have made much greater progress than others; within countries, moreover, it is very far from clear that added income has accrued to all segments of society, most particularly those in the greatest need. Such limited information as is available seems rather to suggest that, in some respects, certain long-

standing and important socio-economic inequalities—notably those between occupational classes—may have widened. The real achievements of the recent past—in creating new centres of industry, in accelerating the exploitation of natural resources, expanding transport, communications and energy production, and generally in strengthening the 'modern' sector of development—have made it all the more obvious that there are very large and perhaps growing numbers of Asians who have not yet emerged from their age-old poverty.

In spite of the progress recorded in recent years, the average *per capita* income of the countries in the region is still very low. What makes the income situation more acute is the fact that an overwhelming proportion of family incomes fall below even this average level of incomes.

The average family size in Asia is around five persons, with certain national variations. Generally speaking rural households are somewhat larger than urban households and very large households are more prevalent in rural areas.

The patterns of income distribution and of the size of the households are of particular consequence for educational planning. An overwhelming proportion of children in Asian countries to whom educational facilities have to be extended come from circumstances of acute family poverty and belong to large families where the fact of sheer number in the household combines with poverty to deprive the child of the attention that the family could otherwise give.

The situation of poverty is reflected in the use of child labour prevalent in most countries of the region. Table 7 shows the proportion of child labour in the economically active population of certain countries for which some data are available.

The most far-reaching social advances have been those in the field of health, especially in the striking reduction of the mass diseases which formerly exacted a heavy toll of lives in all Asian countries. These achievements while yielding immense benefits in terms of human happiness and efficiency have also contributed to the massive increase of population which Asia is now experiencing. However, large-scale mortality and morbidity from diseases resulting from defective environmental sanitation remain. Several shortages of most categories of health personnel still persist. Table 8 shows the availability of medical services and facilities for certain countries of the region.

In other important respects, social progress is still more difficult to discern. Levels of nutrition are in many Asian countries below, sometimes considerably below,

TABLE 7. Child labour—percentage of economically active children in the 10-14-year age-group (selected countries of the region) (latest available year)

Country	Year	Male	Female
Ceylon	1953	10.3	9.8
China, Republic of	1956	28.8	17.8
India ¹	1953-54	39.2	22.7
Indonesia	1961	22.6	15.6
Korea, Republic of	1955	5.5	3.6
Malaysia (Malaya)	1957	9.7	7.4
Nepal	1952-54	27.3	24.3
Pakistan	1961	49.3	9.1
Philippines	1958	38.7	21.3
Thailand	1960	40.5	50.6

1. Data are for 0-14 years age-group.

Source. *Report of the Asian Population Conference, 1963*, New York, United Nations, 1964.

TABLE 8. Availabilities of medical personnel, 1960 (or latest available year)

Country	Year	Inhabitants per		
		Physician	Nurse	Midwife
Afghanistan	1960	40 000	46 688	139 600
Burma	1960	11 000	9 470	5 576
Cambodia	1960	84 000	4 303	9 699
Ceylon	1960	4 500	15 365	13 511
China, Republic of	1960	1 500	15 600	13 450
India	1959	5 000	6 396	11 829
Indonesia	1960	48 000	5 810	44 192
Iran	1960	3 800	7 577	...
Korea, Republic of	1960	3 500	5 099	5 965
Laos	1960	100 000	3 296	300 000
Malaysia	1960	6 400	2 259	7 115
Mongolia	1956	2 400	246	...
Nepal	1960	72 000	354 462	341 333
East Pakistan	1960	9 300	75 654	179 180
West Pakistan	1960	7 600	16 859	29 049
Philippines	1960	16 940	3 995	15 050
Thailand	1960	7 800	2 855	5 408
Viet-Nam, Republic of	1960	29 000	6 250	23 874

1. Approximate.

Source. *Annual Epidemiological and Vital Statistics*, Geneva, WHO, 1960.

the minima considered necessary to maintain satisfactory health; the region as a whole has yet to regain even the inadequate pre-war standards. The housing situation in general seems to have become considerably worse, in a large measure because of heavy migration to urban areas and the rapid growth of cities has made enormous demands on the struggling social welfare services of the region.

Although employment has increased numerically in the wake of development efforts, it has not kept pace with the flow of new additions to the labour force, so that an increasing backlog of unemployed (including many educated people) is being added to the traditionally large pool of under-employed labour. The distribution of the labour force in Asian countries is marked by heavy dependence on agriculture which accounts for nearly 71 per cent of the economically active population. Those engaged in professional, technical and related occupations and as wage and salary earners form a low proportion of the labour force.

The incidence of unemployment tends to be more severe on young people. For example, studies in Ceylon and the Philippines have revealed that of those unemployed, more than half were under 25 years of age.¹ In certain countries of the region there is a high incidence of unemployment among educated people, a phenomenon due as much to training of the wrong kind and ingrained occupational preferences as to lack of opportunities.

Table 9 shows estimates of unemployment rates for certain selected countries for which some data are available.

Related to these specific problems of improving human well-being are even wider social questions that await definitive answers. These include the needs for increasing the efficiency of organization and administration in all types of development programmes, and generally closing the gap between planning and implementation; for the prompt execution of fundamental and well-articulated reforms—especially in systems of land tenure and local government; for obtaining enthusiastic public participation in the broad development effort; and for encouraging, at all levels of society, attitudes and habits that are conducive to vigorous economic and social growth. Seen in this light, the task ahead will be as much one of revitalizing the human climate in which development of all kinds takes place, as of adding to the stock of material capital.

TABLE 9. Estimated unemployment for selected countries of the region (latest available year) (as percentage of total labour force)

Country	Period	Urban	Rural
Ceylon	1959-60	14.0	10.0
India	1961	7.0	6.0
Korea, Republic of	1962	15.8	3.6
Malaya, Federation of	1962	—	6.0
Indonesia	1961	—	5.4
Philippines	1962	—	6.5

Source, *Economic Bulletin for Asia and the Far East*, New York, United Nations, June 1965.

If the educational situation is seen in this social context, the crucial needs are apparent; that large numbers of children should have a thorough educational exposure, and that the schools should offer programmes calculated to orient the children towards active participation in the tasks of development and modernization. A considerable handicap in Asian education is the widespread preference for an academic type of education, unsuited to the requirements of modernization and development. The school systems are sometimes geared more to the needs of the traditional past than to those of the expanding future. The philosophy and practice of teaching in Asian countries often work to discourage inquiry and initiative among the students and tend to perpetuate a static and passive outlook on society and its problems; there is excessive emphasis on conformity, and not enough on independent discovery; literary subjects, looking towards prestigious white-collar employment, take undue precedence over practical and scientific instruction. These are by no means unvaried features of Asian education—nor are they found in Asia only—but they contribute to drive considerable numbers of students out of school or leave them unequipped for productive work in the modern environment.

In Asia as a whole, the distribution of educational facilities is highly irregular, reflecting disequilibrium between different regions within countries and widespread urban-rural imbalances; in many countries, also, large groups of the eligible population are effectively excluded from school due to the prevalence of poverty and all that this implies—poor health and nutrition, inability to buy school clothing and supplies, widespread child labour, increasing family disorganization complicated by internal migration, and generally unfavourable circumstances in the home; still further limitations are imposed by the negative attitudes found in some countries towards the education of girls and women. The same disequilibrium can also be said of adult education. Facilities are very unevenly distributed and not systematically related. The vast majority of illiterates and semi-literates have not had access to education, even where it has been provided; education policies, problems of communication, health, poverty, etc., have hindered participation. Women have suffered even greater disadvantages than men in this respect. Family responsibilities, social taboos, lack of facilities have resulted in discrimination against them, and of the 300 million adult illiterates in Asia and Oceania

1. ILO, 'Employment Objectives and Distribution of Labour Force in ECAFE Countries', paper for the Conference of Asian Economic Planners, Bangkok, October 1964.

in 1962 more than 61 per cent of women between the ages of 15 and 44 were illiterate.

It is being increasingly realized by Asian leaders and planners that such complex and all-pervasive social problems as these cannot be effectively tackled on a piecemeal basis, and still less on the assumption that social progress is an automatic consequence of economic growth. For this reason, there is evidence in a number of Asian countries of rising emphasis on comprehensive social policies and plans, closely aligned with strategies for economic development. The need for integrated strategy is perhaps nowhere more clearly evident than in the field of education both in school and out of school. This is the real significance of current interest in what has been termed 'balanced and integrated social and economic development'—in other words, an approach which will boldly grapple with the immense social obstacles to progress, along with the economic ones that have traditionally received the greatest attention, and which will deal with them as organic entities, rather than as separate phenomena.

Progress of education in the Asian region (1955-64)

In 1955, there were about 65 million students receiving education in the countries of the region, representing about 9 per cent of the total population, compared to the estimated world average for that year of around 12 per cent. By 1960, student numbers had increased to nearly 90 million, being about 11 per cent of the total population against a world average of 15 per cent, and by 1964, to 120 million, representing 13 per cent of the total population.

In 1964 the number of students as a proportion of the total population in the region (13 per cent) corresponded to the estimated world average around 1957. The gap appears even more sharply marked when the level of student enrolment in the region is compared with the enrolment in the developed regions of the world. In 1962¹ (the year for which data are available) total enrolment in North American countries was 25 per cent of their total population, in Europe 17 per cent, and in the U.S.S.R. it was estimated as 20 per cent.

A comparison between the situation around 1950 and that prevailing around 1962 would indicate that in Asia, as in the world as a whole, the absolute number of illiterates has increased while at the same time the illiteracy rate has fallen. It is also found that the increase in the

number of illiterates is related to the illiteracy rate and that the correlation coefficient between the two phenomena is 0.55. The rapid growth in total population and a low rate of school enrolment accounts for this situation.

There were more than 300 million adult illiterates in Asia in 1962, i.e., almost half the adult illiterate population of the world. More than 40 per cent of men and 61 per cent of women of 15 years and over were illiterate. As stated earlier, although the percentage of literate persons in Asia has increased constantly in the last decade, the absolute number of illiterate adults also increased by at least 15 million. This would seem to show that the school enrolment effort alone, despite its tangible and sometimes spectacular results, is not at present succeeding on its own in stopping illiteracy by eliminating it at the source. What is needed is a dual effort bearing simultaneously on school enrolment and adult education.

Since the fifties the educational systems of the countries have been expanding rapidly and enrolments have grown at all three levels of education. Table 10 presents the enrolment data. These have to be interpreted in terms of the structure of the educational system which differs from one country to another—school entrance age and the length of each stage or level of education. For purposes of comparability and presenting the picture of the region as a whole, it is therefore necessary to rearrange these data according to a common educational structure and this has been assumed as comprising seven years for the first level and five years for the second level of education—the duration of the third level varying according to the specialized fields of study.² The enrolment data organized on a common educational structure are presented in Tables 11 and 12.

It will be noted that while enrolment has expanded at all three levels of education, the rate of increase is higher at the second and the third levels. There is, in the region as a whole, a perceptible beginning of a shift in the educational effort towards secondary and higher education. The gap between the developing countries of Asia and the developed countries in other regions is more significant at the second and third levels of education. In developed countries the enrolments, as percentages of total population, are two to four times higher than in the region at the second level, and three to nine times higher at the third level.

1. Estimates based on data given in the *Unesco Statistical Yearbook, 1964*, Paris, 1966, 522 pp. North American countries refer to the United States, Canada, Bermuda, Greenland and St-Pierre et Miquelon.

2. See also pages 40-1.

TABLE 10. Estimated enrolments for the Asian region, 1955, 1960 and 1964 (according to national educational structures) (in thousands)

Country	First level			Second level			Third level		
	1955	1960	1964	1955	1960	1964	1955	1960	1964
Afghanistan	112	176	308	8.7	16	37	0.8	1.6	3.0
Burma ¹	1 156	1 602	*1 916	181	266	*389	10	13	*17
Cambodia	359	561	691	² 11	37	87	0.4	1.7	4.8
Ceylon	³ 1 289	³ 1 643	³ 1 795	366	596	*751	4.4	6.7	*16
China, Republic of	1 244	1 889	2 203	214	355	594	20	40	73
India	25 167	34 164	*47 500	6 451	10 835	*14 656	736	1 094	*1 530
Indonesia ⁴	7 511	8 955	*11 600	594	768	*1 150	...	⁵ 108	184
Iran	816	1 430	2 031	145	296	444	10	21	25
Korea, Republic of	2 947	3 621	4 941	748	875	1 066	85	101	143
Laos	⁶ 4	99	145	¹ 1.6	13	8	...	0.1	0.4
Malaysia ⁶	854	1 246	*1 367	⁷ 108	180	*318	0.9	2.6	*4.8
Mongolia	...	⁵ 76	*91	...	⁵ 48	*59	⁸ 4	5	8.3
Nepal	...	⁵ 253	334	...	⁵ 42	55	²⁰ 0.9	4.6	6.2
Pakistan	4 028	5 036	*6 700	1 291	1 515	*2 270	87	149	*260
Philippines	3 499	4 197	5 673	580	670	*1 040	215	309	*530
Singapore	176	285	350	28	59	85	3.1	10	*16
Thailand ⁹	2 953	3 935	4 500	358	328	402	26	51	55
Viet-Nam, Republic of	534	1 278	1 564	56	209	338	3.1	12	25

1. Public only.

2. 1954.

3. Includes enrolment in pre-primary schools.

4. Not including West Irian.

5. 1961.

6. Including Sabah and Sarawak.

7. Not including teacher training.

8. 1957.

9. 1955 figures for first and second levels refer to Grades I-IV and V-XII respectively; 1960 and 1964 data refer to Grades I-VII for first level and Grades VIII-XII for second level (365,954 pupils were enrolled in 1960 in Grades V-VII).

Source. Except for the 1964 estimates obtained by extrapolation (marked*), data are official figures from national and Unesco publications and data from the reports of the Unesco Regional Advisory Teams for Educational Planning in Asia.

TABLE 11. Total enrolment, percentage of total enrolment and enrolment ratio by level of education, 1955, 1960 and 1964¹

Year	Item	First level	Second level	Third level	Total
1955 ²	Total enrolment (millions)	58.2	6.4	0.8	65.4
	Percentage of total enrolment	89.0%	9.8%	1.2%	100.0%
	Enrolment ratio	46	9	1.6	27
1960	Total enrolment (millions)	78.6	10.0	1.3	89.9
	Percentage of total enrolment	87.5%	11.1%	1.4%	100.0%
	Enrolment ratio	53	12	2.3	31
1964	Total enrolment (millions)	103.8	14.4	1.9	120.1
	Percentage of total enrolment	86.4%	12.0%	1.6%	100.0%
	Enrolment ratio	61	15	3.0	36

1. Enrolment ratio is enrolment as a percentage of corresponding age-group (6-12, 13-17 and 18-21 respectively). For explanation of 'levels' see pages 40-1.

2. Since the distribution of the population by single years of age and the distribution of enrolment by grades were not available for that year, the 1955 figures were estimated.

At the second level, enrolments increased by 8 million between 1955 and 1964. The main increase, however, occurred in general secondary education. The enrolment in vocational education formed less than 20 per cent of the total second-level enrolment, and includes only a small proportion in engineering and agricultural forms of

TABLE 12. Increase of total enrolment by level of education, 1955-64

	Total increase (1955 = 100)	Annual rate of increase
First level	178	6.7%
Second level	225	9.4%
Third level	239	10.1%
TOTAL	184	6.9%

vocational education. The participation of girls in this type of education is usually very limited and restricted to a few specialities. Much of the expansion in vocational forms of education took place during the last five years and standards and quality have yet to be stabilized.

The percentage of girls enrolled determines significantly the total enrolment ratios. In Asia, the future quantitative expansion of education particularly at the first and second levels depends on how fast girls' education can be expanded. The improvement which in this respect has taken place in the recent past may be seen from Table 13 which shows girls' enrolment as percentage of the total enrolment at the first and the second levels respectively for 1955 and around 1964.

TABLE 13. Countries classified by percentage of girls in the enrolments at the first and second levels, 1955 and around 1964

Percentage of girls enrolled	First level ¹		Second level ²	
	1955	Around 1964	1955	Around 1964
Less than 10	Afghanistan	—	—	—
10-20	Cambodia	Afghanistan	Afghanistan Cambodia India Indonesia Laos Pakistan Viet-Nam, Republic of	Afghanistan Cambodia Pakistan
21-30	Laos Iran Pakistan	Pakistan	Burma China, Republic of Iran Korea, Republic of	India Laos
31-40	India Indonesia Malaysia Singapore Viet-Nam, Republic of	Cambodia India Iran Laos	Malaysia Singapore Thailand	Burma China, Republic of Indonesia Iran Korea, Republic of Malaysia Singapore Viet-Nam, Republic of
41-50	Burma Ceylon China, Republic of Korea, Republic of Philippines Thailand	Burma Ceylon China, Republic of Korea, Republic of Indonesia Malaysia Philippines Singapore Thailand Viet-Nam, Republic of	Philippines	Philippines Thailand

1. Excluding Mongolia and Nepal, for which separate data are not available for the two years. For Mongolia the number of girls represented 49 per cent of the total enrolment in 1963 and for Nepal 14 per cent in 1964.

2. Excluding Ceylon, Mongolia and Nepal. For Nepal the number of girls represented 21 per cent of the total enrolment at this level in 1964.

Source. Data derived from information obtained from national and Unesco publications and the reports of the Unesco Regional Advisory Teams for Educational Planning in Asia.

At the third level, enrolment increased by over a million students between 1955 and 1964 or nearly 130 per cent, and the enrolment ratio advanced from 1.6 per cent to 3.0 per cent. Complete data relating to distribution of

enrolment by branches of study are not available for all countries and for all the years under review, but an indication of the general trend is disclosed by the figures that are available for some of the countries for the periods near about 1956 and 1963. They show that around 1956, 35 per cent of the third-level enrolment was in science and science-based technical and professional subjects and by 1963, the percentage advanced to 38.

Progress in enrolment and diversification in its distribution are not enough. Ultimately it is through the output at each level that an education system makes its contribution toward upgrading the educational level of the population. Most countries in the region have yet to solve the problem of 'drop-outs'. For the region as a whole it is estimated that at the first level, out of 100 children who enter Grade I, only 40 reach Grade V. At the second level, it is estimated that only 50-55 per cent of those studying in the terminal grade graduate successfully. The progress of pupils through the education system is marked by high incidence of drop-outs.

In 1955, the total teaching force for school levels of education was about 1.9 million. It increased to 2.6 million by 1960 and 3.1 million by 1963. The teaching force at the primary level increased by about 42 per cent over the period. The secondary-level teaching force which constituted about 27 per cent of the total teaching force at the school level in 1955 rose to about 37 per cent by 1963.

The level of educational qualifications of the teaching force is an important factor in the quality of an educational system and a means for improving it. Unfortunately information about the countries in the region in this regard is very limited. Some data are, however, available on the proportion of trained and untrained teachers for nine countries, which account for more than 75 per cent of the total enrolment in the region. Around 1961-62, at the primary level 30 per cent of the teachers were untrained (this average covering a range of 5 per cent to more than 50 per cent), and at the secondary level the corresponding figure was about 23 per cent.

The total expenditure on education comprises expenditure from public revenues and private institutions, as well as expenditures met by parents (for textbooks, school uniform, etc.). While precise data are not available on expenditure from private sources, it is estimated at about 20 per cent of the total for the region as a whole. Its incidence, however, differs from one level to another; at the first level it is the least; at the second level, it ranges from 1 per cent to 35 per cent, and at the third level it is the highest ranging from 25 per cent to 45 per cent. The general trend, however, which is establishing itself

TABLE 14. Public expenditure on education around 1955, 1960 and 1964 (in millions of national currency)

Country	Around 1954	1960	Around 1964
Afghanistan	191	207	452
Burma	197	112	156
Cambodia	¹ 250	794	1 138
Ceylon	160	312	² 345
China, Republic of ³	¹ 580	1 265	⁴ 2 240
India ³	1 896	2 341	⁵ 4 750
Indonesia	⁶ 913	2 604	...
Iran	¹² 500	7 490	⁴ 10 178
Korea, Republic of	6 029	9 000	13 100
Laos	199	245	⁴ 561
Malaysia ⁷	192	178	252
Mongolia	...	143	270
Nepal	⁸ 4	14.3	28.8
Pakistan ³	160	310	690
Philippines	⁹ 200	344	⁴ 507
Singapore	41	² 75	¹⁰ 82
Thailand	934	1 364	1 977
Viet-Nam, Republic of ³	¹ 326	1 501	⁴ 2 026

1. 1954.

2. 1961.

3. Including provincial and local authorities.

4. 1963.

5. 1965.

6. 1952.

7. States of Malaya.

8. 1953.

9. 1956.

10. 1962.

Source. Data from official publications and Unesco reports.

clearly is for public expenditure to increase in weight and scope.

Table 14 shows the total amount of public expenditure on education for each country for the years around 1955, 1960 and 1964, in current market prices. Though the comparability of data relating to different years is affected by the price variations the figures are useful as broadly indicating the order of increase that has taken place.

In 1955, the total public expenditure on education in the region was approximately U.S.\$700 million. In 1962 it had increased to nearly U.S.\$1,600 and around 1964 to about U.S.\$2,000 million, recording an increase of nearly 180 per cent over the period 1955-64 with an average rate of increase of 12 per cent. The expenditure *per capita* of population was a little less than U.S.\$1 in 1955, \$1.8 in 1962 and over \$2.0 around 1964. Around 1964, total public expenditure on education constituted approximately 2.4 per cent of the GNP.

As Table 15 shows, in 1955 most countries of the region were spending between 1 and 2 per cent of GNP on education, and no country was spending more than 3 per cent. Around 1964, the range becomes wider, though a

TABLE 15. Public expenditure on education as percentage of GNP, 1955 and around 1964

Proportion of GNP spent on public education	Number of countries	
	1955	Around 1964
1.0% or less	3	—
1.1 to 2.0%	9	5
2.1 to 3.0%	3	5
3.1 to 4.0%	—	2
4.1 to 5.0%	—	3
TOTAL	15	15

majority of the countries are still devoting less than 3 per cent of GNP to education.

Data about the share of capital expenditure in the total educational expenditure are not available for all countries, but there is a marked tendency for expenditure on capital account to form a relatively higher proportion of total expenditure than is normally to be expected. This is due to the fact that in most countries the growth in the number of new institutions has been unprecedentedly high during the last ten years.

Current developments

The broad objectives of the future development of education in Asia were expressed in the final resolution and statement of the Meeting of Ministers of Education at Tokyo (April 1962) and reaffirmed by the Conference of Ministers of Education and Ministers responsible for Economic Planning of Member States in Asia (Bangkok, November 1965). The major themes that emerged from these statements are:

1. The need for balanced development of education at all levels, with the expansion of secondary and higher levels being determined by the ability of pupils, availability of financial resources and manpower requirements of the country.
2. The importance of qualitative considerations for development. The need for achieving higher standards at the second and third levels is imperative. Even at the primary level the maintenance of proper standards in order to prevent wastage and to provide a satisfactory basis for the higher level is essential.
3. The need for diversification of education by enlarging and strengthening vocational and technical education at the second and third levels in line with the developing capacity of the economy to utilize trained skills.

S.C.E.R.T., West Bengal

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4. Expansion and improvement of science education at all levels.
5. Promotion of programmes of adult and youth and family education as an integral part of over-all educational development.
6. Development of education should reflect the principle of equality of educational opportunity and the promotion of international peace and amity.

The objectives and principles of the Tokyo meeting are reflected in national plans, though they may be expressed in somewhat different terms in different countries and with varying emphasis. Underlying them is the belief held in common that education serves more than one purpose, and makes its most effective contribution to any one section of national life when it is designed so as to serve a variety of purposes, individual and social. It is for this reason that the expansion of education is recognized as a powerful driving force in economic, social and political development in the modern world.

Planning for educational development as an integral part of economic and social development is beginning to establish itself in the countries of the region. Very few countries, however, have formulated long-term plans for education. The over-all objectives of educational development have therefore to be derived from their short-term plans. Again, very few countries have been able so far to include in their development plans provisions for literacy programmes and to link adult education projects with priority development schemes. Still fewer countries have up till now put such provisions into practice. Education chapters in short-term and medium-term development plans are still generally foreseen in the traditional way. This is due to the lack of manpower projections, to the lack of any established link with technological change of human resources, and also to traditional ways of thinking and a tendency to underestimate the importance of training for adults. Convincing research on the economic impact of adult literacy and adult training schemes are very scarce. The experimental projects of the World Literacy Programme should provide evidence on these matters. But even the existing facts should lead countries to start with limited and gradually expanding literacy programmes linked with development and manpower needs.

In countries where first-level education is approximating universal provision, the trend is towards extending the period of schooling. In the Republic of China, for instance, the aim is to extend compulsory education to the age of 15 (with a total duration of nine years) and to expand the school enrolment in the elementary and junior high school as near as possible to 100 per cent. A successful start has

been made with some pilot projects in this field and according to the Unesco itinerant planning team, by 1973 compulsory education at the junior-high level will have been achieved. Similarly, in Malaysia the school-leaving age is being raised to 15 as laid down in the education review of 1960. In Ceylon¹ it is proposed that universal, free and compulsory basic education be provided for all children between the ages of 6 and 14 inclusive. Thailand² considers its first objective to improve and expand lower elementary education (Grades I-IV) and then to increase the duration from 4-7 to achieve seven years of compulsory education throughout the country. For this purpose four compulsory education extension projects have been started in the provinces.

In the majority of Asian countries introduction of compulsory education is a major objective. In India, the present targets imply that by 1970-71, 87.7 per cent of the age-group 6-11 will have been actually enrolled³ and it is anticipated that by 1976 all the children of this age-group would be in school. The outline of the third plan in Pakistan aims at 70 per cent of the age-group corresponding to Grades I-V by 1970. Pakistan aims at universal primary education of eight years' duration of all children by 1985. The outline points out that 'more important than the increase in enrolment in Grade I will be an increase in the retention of the children, so that 50 per cent of the appropriate age-group are in Grade V, instead of less than 20 per cent as at present'. The Indian plan also includes wastage among the three main problems in the field of education, the others being the difficulty of bringing girls to school and the backwardness of certain areas and sections of the population. The plan states: 'By far the most important objective in the field of education of girls at different stages during the third plan must be to expand the facilities of school education. Special emphasis must be laid on creating suitable conditions for encouraging parents to send their daughters to schools.' The Pakistan plan draws pointed attention to this problem 'which stems from deep-seated attitudes and will only yield to equally radical changes'.

In Afghanistan the long-term plan (1965-80) aims at an enrolment in primary schools of 50 per cent of the school-age children. In Laos the growth rate of primary-school enrolment was 50 per cent over four years (1962-65)

1. Ceylon, Ministry of Education, *Proposals for a National System of Education*, Colombo Government Press, 1964, 65 pp.
2. Thailand, National Economic Development Board, *The National Economic Development Plan, 1961-1966. Second Phase 1964-1966*, Bangkok, 1964.
3. India, Planning Commission, *Memorandum on the Fourth Five-year Plan. October 1964*, New Delhi, 1964, 97 pp.

but now more emphasis is being put on functional literacy and pre-vocational training. Nepal in its three-year plan (1962-65) has put particular emphasis on organizing and improving existing schools.

In the Philippines the Bureau of Public Schools has as a main target the implementation of six-year compulsory elementary education and its upward extension by the opening of Grade VII. A target of 90 per cent enrolment of 7-year-old children in 1980 is aimed at.

In Burma,¹ high priority is envisaged for expansion of primary education as a basic step towards enforcement of compulsory education which is expected to be achieved by 1970. In Iran,² the twenty-year plan (1963-83) aims at providing free and compulsory education for the age-group 7-13. The third five-year plan of this country (1962-68) envisages the possibility that this objective might be achieved by 1988, and proposed for 1967 a target of 60 per cent of this age-group. The creation of the Education Corps (Army of Knowledge) may, however, make possible the achievement of a higher rate of increase.

The extension of the period of compulsory schooling implies that there will be a large development of junior secondary³ education, mainly in the general and diversified stream. National plans reflect greater emphasis on the development of technical and vocational education at the second level. In the Republic of Korea, for instance, one of the objectives of the first five-year plan of education reconstruction instituted in 1961 was to develop technical education through a 20 per cent increase of enrolment in technical high schools and an improvement of school facilities and curricula. The ten-year (1965-74) plan for extension of secondary education aims at quantitative extension of secondary education also, with the target of at least seven years of compulsory education to be achieved by 1980. In Pakistan, the outline of the third plan recommends a 'major break-through at all levels of technical education' and foresees for the period 1965-70 an increase of nearly three times in the intake capacity of institutions for the training of engineers, more than three times for technicians and as much as six times for craftsmen. The plan for Thailand, when referring to vocational and technical education provides for stronger financial support, more teaching and training equipment with highest priority given to practical training. After stating that 'of all the resources for development, perhaps the most fundamental at the present time is trained manpower', the third five-year plan for India includes an estimate of the skilled personnel needed at the various levels, based on manpower planning, and provides for a large increase at all levels of technical vocational education. The second five-year plan of Afghanistan also

gives priority to technical and vocational education in view of the 'acute paucity of professional and technical skills at all levels and considering that education and training are an integral part of practically every single project or programme included in the second plan'.⁴

The Republic of China has launched a six-year secondary-education expansion programme, in order to expand junior and senior secondary schools to increase the opportunities for youths to receive further education.

In Malaysia, where 35 per cent of the graduates of primary schools passed their entrance examination for secondary school, a new system has been introduced in 1965, to enable nearly all pupils from primary schools to take an additional three years of lower secondary education with a diversified form of education.

Nepal started in 1961 to convert all secondary schools into multi-purpose ones and the ultimate aim is to convert all traditional schools into vocational oriented schools.

In Singapore, the programme of providing at least two years of post-primary education in secondary vocational schools has been implemented for those who have completed at least six years of primary education and are over the age of 14, but who have not shown any academic bias in the primary-school leaving examination.

The national plans envisage an even faster development for teacher training in order to improve the present situation and to meet the future needs corresponding to the development of primary education. In Pakistan, the number of teachers is expected to increase from 184,000 to 300,000 in five years while there will be a 'vigorous programme of in-service training of existing teachers'. In India, the estimates provide for enrolment in elementary-teacher training institutions increasing threefold during the next five years. The programme included in the third plan involved an increase of about 61 per cent (in five years) in the number of primary-teacher training schools and about 40 per cent in secondary schools. At the end of the plan, the proportion of trained teachers was expected to rise to about 75 per cent so that refresher courses and in-service training would be necessary. In Afghanistan, enrolment in teacher-training institutions was expected nearly to double during the five-year period 1962-67.

1. Burma, Ministry of Education, *Basic Data for Educational Planning, 1964-1970*, Rangoon, 1964, 81 pp.
2. According to the report of the Unesco itinerant planning team.
3. The definition differs according to countries, but it usually covers Grades VI-VIII or VII-IX.
4. Afghanistan, Ministry of Planning, *Second Five-year Plan, 1341-45. (1962-67)*, Kabul, 1963, 100 pp.

In many countries of the region a reorganization of the training of teachers to improve quality is being undertaken. In the Republic of Korea, for example, the government has abolished the normal school system at the secondary level and has established instead a junior teachers' college system in 1962 for training primary-school teachers.

In-service training of teachers is receiving a high priority in almost all countries of the region.

Most plans and programmes in Asian countries strongly emphasize the importance of quality and the need for modifying the content of education. These concepts are finding expression in highly significant forms of reorganization: the new basic education (Ceylon), comprehensive education (Malaysia), primary community education (Republic of Viet-Nam), and rural community education centres (Laos).

The reorientation of secondary education is receiving increasing attention. The outline of the third plan for Pakistan describes the changes under way: 'It is secondary education that provides the largest number of people with the requisite skills and intellectual ability to meet the immediate and multifarious needs of a rapidly expanding economy. This stage should therefore be looked upon mainly as terminal rather than merely preparatory to university. It is for this reason that secondary education in Pakistan is undergoing something of a revolution.' Similar concern is expressed by most other countries, many of them referring to the extension of a comprehensive form of education to the second level. In Burma, where there are already a number of schools with vocational bias, further expansion is foreseen in this direction. In Cambodia¹ since 'the country cannot afford to set up a sufficient number of technical and vocational schools, parallel to the development of secondary academic schools', it is suggested 'to reform the present system of secondary education by giving it a polytechnic character, through the creation of two types of classes in the same schools; one technical and vocational preparing the students for different careers and one general for the preparation to teacher-training institutions and universities'.

Other qualitative improvements recommended by the various national plans include changes in the curricula (with priority given to science teaching), better teaching methods, up-grading and in-service training of teachers.

At the higher level, a major shift from arts to scientific subjects is recommended by nearly all plans, particularly in India and Pakistan. In the former country, the third plan mentions that suitable criteria for selection will have to be adopted in view of the large number of students

seeking admission. In Pakistan, improvement of quality, expansion of facilities for study and research in scientific and technological disciplines and consolidation in general will be the keynote of the development of universities in the third plan.

In the Republic of Korea the long-term plan of higher education aims at solving the problem of shortage of teachers in three years (1966-68) and has developed a broad system of in-service training of college professors by exchange programmes within the country and abroad.

Literacy programmes are receiving greater attention in a growing number of countries. In India, for example, in order to eradicate the high percentage of illiteracy amongst the adult population, a massive programme of adult education is envisaged with the active support of the community at all levels. Besides adult literacy classes, it is proposed to undertake an integrated programme of continuation classes, condensed courses and to provide more libraries and reading facilities. The rural development programme of Malaysia includes adult education as an integrated part with the ultimate aim of turning the adults into functional literates. In Iran, the teaching of the elements of literacy to the vast groups of rural inhabitants is one of the major points in the programme of the Education Corps, and one of the striking successes of the programme lies in the fact that it has been able to attract a considerable number of rural girls to school classes.

Assessment of educational needs

From an examination of national plans and their objectives, the following broad considerations emerge for assessing the educational needs of the countries in the coming decades:

1. Assessment of educational needs must take account of the social and cultural demands expressed in a rising level of aspirations which characterize the development process in the region. On the one hand, rising standards of living, which is the common aim of national economic plans, will be reflected in a sharply increased demand for education; on the other hand, the satisfaction of these aspirations will significantly strengthen the socio-cultural framework which is indispensable for general development. The potential objectives of a literacy programme must include the attenuation of

1. Cambodia, Ministère de l'Éducation Nationale et des Beaux-Arts, Office National de Planification de l'Éducation, *Le Royaume du Cambodge vu par les Planificateurs de l'Éducation*, Phnom Penh, 1963.

the social and cultural disparities between different sections of the population which slow down development. It was stressed at the Teheran world congress that the difference in the cultural level of the male and female sections of the population appears to be particularly detrimental to harmonious development.

2. In most of the countries in the region, there are large sections of the population, particularly women and people from the rural areas, who have relatively limited access to education. This access is also considerably affected by social inequalities, as children belonging to poor families have to overcome more difficulties in continuing and completing their studies. The principle of equality of educational opportunities, reiterated by the Tokyo Meeting of Ministers of Education, is therefore of importance for the progressive reduction of these disparities. Furthermore, the provision of education, by giving more opportunities to the talented children, should contribute to reducing social inequalities and promoting social mobility.
3. With only 13 per cent of the total population receiving formal education and the high attrition rates that prevail, the existing education systems leave the pool of ability largely untapped. There is a growing body of research evidence to show that the incidence of ability is distributed in all socio-economic groups in a country. Since the bulk of the population is in lower income groups and has relatively fewer educational opportunities, the larger part of the national resources of ability remain unutilized in a narrowly based education system. The potentiality of the rich human resources in Asian countries has to be realized through development of education on a scale and in a form that should be adequate and suitable to meet the emerging needs.
4. One of the important links of education with over-all development is through the knowledge and skills education produces in the labour force, and the capacity for inventiveness and ability to adapt innovations that it fosters. This consideration has an immediate bearing on the second and third levels of education and the programmes of adult education. The aim of a long-term plan for educational development is not so much to prepare for specific occupations—the patterns of which will necessarily change with economic growth—as to build into the education system the capacity to meet the needs of training and re-training which short-term plans may identify. While it is neither desirable nor academically sound that an

education system should be controlled or its size and structure determined exclusively by consideration of skilled manpower requirements, such requirements nevertheless are one of the important elements in the shaping of educational policies.

There are, however, inherent constraints and limitations on the magnitude of educational expansion and improvement which can be undertaken in any period of time.

1. The first constraint is the potential for growth of an educational system, which is determined by the optimum rate at which the real resources of education, such as training and supply of teachers, school buildings, etc., can be most effectively deployed and developed. An education system is a producer of manpower and also one of its largest consumers. Its claim on the supply of manpower has to be contained within limits consistent with the needs of other sectors of the national economy.
2. The second constraint arises from the necessity of maintaining internal consistency within the education system. While the growth of enrolments on higher levels is determined by the enrolments at the lower levels, and can be quickened only to the extent that the base is enlarged, it is equally true that expansion at the lower levels in turn must depend on the output of teachers from the higher levels.
3. The third constraint is presented by the scarcity of financial resources. Though all too familiar, it is least amenable to precise formulation. There is no norm that can be derived, with any measure of confidence, from the experience of other countries to set the upper limit of investment in education though at the lower reaches the correlation between a low rate of investment in education and a low level of economic development is well established. However, even with a wide range of decisions in regard to levels of investment in education, the operation of this constraint is decisive and underlines the need for carefully examining how the resources should be distributed internally between different levels and fields of study and between qualitative improvement and quantitative expansion to give the optimum returns in terms of over-all national development objectives.
4. The fourth constraint consists in barriers to education which have their origin in deeply entrenched social attitudes, for example, in spreading girls' education, or arise from other circumstances, for example, multi-language situation in a country which presents major problems in the provision of teachers and textbooks.

Chapter 2

Concepts for a model of the educational system

In the past, quantification of educational-policy decisions has usually been done on an *ad hoc* basis specifically to examine the feasibility of one set of targets. This has led to a certain inflexibility of the method. In an effort to free decision-making from the limitations imposed by quantification as it is commonly practised, an attempt is presented here to systematize the methodology in such a way as to develop a tool that serves rather than restricts the educational planner and policy-maker, giving wide possibility of choice.

The main methodological concept is to regard school education as a system through which a flow of people proceed from grade to grade and type to type. In this context it should be noted that the use of modern computers gives great flexibility by allowing rapid quantification of policy alternatives not only for a target year of levels of education but also for all grades and types of education, all intermediate years being shown.

This methodology is not intended for determining targets but for quantifying various educational hypotheses. This tool of considerable flexibility is at the disposal of the policy-makers who determine the educational hypotheses and it will show the quantitative implications of those assumptions and thereby contribute to an understanding of the complex interrelationships between different variables. Thus the results obtained as output are not definitive but may be considered as a quantitative description of the consequences of the hypotheses which may then be analysed by policy-makers.

The methodology consists of the application of well-known methods of statistical projections, programming and quantitative analysis proved in many diverse fields of

The Asian Model and projections of educational development

research but not widely used as yet in the educational planning process.

The educational system when viewed quantitatively at any point in time is the result of its past evolution, i.e., the movement of populations into, through and out of the educational system. The main factors in determining the magnitude of the result of this movement at any time are the size of populations entering (eligible for entry, i.e., a specific age cohort for school education, a particular occupational group in in-service training, or adult education, etc.), the proportions of these entering and continuing through the system and their distribution among various types of education within the system. The values of the factors involved are determined both by educational and non-educational conditions. Some may be direct policy decisions for the future, either short or long term, such as a decision to enrol a given proportion of the school-entering population age-group, the decision to give in-service training to a specific proportion of an occupational group, the decision to give literacy training to a proportion of a specified illiterate population group. Others may be determined by essential conditions outside the control of educational policy-makers such as population changes, manpower demand, economic, social and political considerations.

The quantitative implications of decisions directly related to educational policy such as pupil-teacher ratios, teacher qualifications, scholarships, etc., which in practice can be observed only over a long period of time, can be demonstrated very quickly by using this method with modern computing equipment. *In other words, the Model represents a tool that can simulate the dynamics of future consequences of changes in any quantifiably defined conditions affecting the educational system.* Obviously there remain many factors, notably of a 'qualitative' nature, that cannot, at present, be adequately quantified.

As research progresses and these factors are identified quantitatively they can be included in the Model.

The enrolment in the third year of a university science faculty in 1980, for example, is the cumulative result of (a) the number of children who were born in 1960 and survived to age 6 in 1966 (assuming this to be the school-entering age); (b) the proportion of 6-year-olds entering the first grade in 1966; (c) the proportion continuing through the primary school from grade to grade, which may be affected by such things as compulsory school attendance for a specific duration; (d) the proportion entering second-level education in 1973 (assuming the primary course to be of seven years' duration) and the distribution of these among various types of education; (e) the proportion continuing through second level from grade to grade and the distribution among various types of education at various stages; (f) the proportion entering higher education in 1978 (assuming the second level of education to be of five years' duration) and the distribution of these among various types of higher education; (g) the proportion in the university science faculty continuing through higher education from year to year until 1980.

The actual cohort size experiencing these phenomena is determined not only by the proportions set but also by such other demographic factors as death-rates, migration, etc. Furthermore the educational proportions are in themselves influenced by such educational factors as the availability of school facilities, the quality and quantity of teachers, supervisors and administrators, teaching methods, current educational research and its application. They are also affected by such non-educational factors as social, political and economic requirements and constraints.

The concepts as expressed in the formulae below¹ are composed of a large number of relevant elements, the values of all of which may not be known in all countries. In the absence of some of these elements, however, valid results may nevertheless be obtained provided those elements deemed to be essential by the planner exist or can be estimated with a reasonable degree of accuracy.

A. School enrolment

In this model, which is a dynamic one following cohorts into and through the system, enrolment in any grade at any time is composed of those entering the system in that grade who come from the population-age cohort that has never previously entered the system plus those in that grade who are already in the system (having entered for the first time previously). Thus first entry can

occur but once, it can theoretically take place at any age for any grade but generally occurs at the normal school-entering age (or age-range) for the first grade in the system. Those enrolled in any grade might consist of pupils of different ages and those of any age cohort might consist of pupils of that age in different grades. In most cases, especially where compulsory school attendance is defined by age, there will be a pronounced age-grade correspondence, especially in the lower grades. Enrolment in any grade, in addition to those coming into the system for the first time and those coming from the previous grade in the previous year, will also consist of those repeating that grade. Enrolment of any age cohort in any grade (age-grade specific enrolment) in a given year may be expressed:

(Formula A-1)

$$E_y^{(a, g)} = e_y^{(a, g)} B_y^{(a)} + s_{y-1}^{(a-1)} r_{y-1}^{(g-a)} E_{y-1}^{(a-1, g)} + s_{y-1}^{(a-1)} p_{y-1}^{(g-1-a)} E_{y-1}^{(a-1, g-1)} + I_y^{(a, g)} + N_y^{(a, g)}$$

where: E = enrolment, full-time

a = age

g = grade

y = year

e = rate of first-time enrolment

B = population not previously enrolled

r = repetition rate

p = promotion rate

s = survival rate, demographic

I = net immigrants into the school system, i.e., if the school were a national one, the net immigrants would be those coming from other countries less those going to other countries

N = newcomers who have previously been in the school system but have not been a part of it for one or more years

\rightarrow = going to

which means: enrolment of an age cohort in a grade in a year is equal to the rate of first-time enrolment of that age cohort in that grade in that year multiplied by the population not previously enrolled of that age in that year, plus the survival rate of the age cohort ($a-1$) in the previous year multiplied by repetition rate for that grade

1. See Appendix G for a glossary of symbols used in the concepts for a model.

in the previous year who stay in grade (g) in the subsequent year multiplied by the enrolment of the age cohort ($a-1$) in grade (g) in the previous year plus the survival rate of the age cohort ($a-1$) in the previous year multiplied by the promotion rate of grade ($g-1$) in the previous year who go to grade (g) in the subsequent year multiplied by the enrolment of the age cohort ($a-1$) in grade ($g-1$) in the previous year plus the immigrants of age (a) into the school system in the same grade (g) in the same year plus the newcomers of age (a) who have previously been in the school system but have not been a part of it for one or more years.

It will be noted that the expressions for the repetition rate and the promotion rate specify both where pupils come from and where they go to in the subsequent year. Thus, the expression $r_{y-1}^{(g \rightarrow g)}$ is the repetition rate for pupils from grade (g) in the previous year who go to grade (g) in the subsequent year and the expression $p_{y-1}^{(g-1 \rightarrow g)}$ is the promotion rate for pupils from grade ($g-1$) in the previous year who go to grade (g) in the subsequent year.

For those grades where first-time enrolment does not exist the value of the rate of first-time enrolment is equal to zero. Similarly, for the beginning grade of the school system the value of the promotion rate is necessarily equal to zero and obviously enrolment in grade ($g-1$) does not exist.

The population not previously enrolled (B in formula A-1) is expressed by:

(Formula A-2)

$$B_y^{(a)} = s_{y-1}^{(a-1)} \left(P_{y-1}^{(a-1)} - \sum_{i=0}^{i=n} E_{y-1}^{(a-1, g \pm i)} \right)$$

where: P = population

n = any number

\sum = sum of

which means: the population not previously enrolled of the age cohort (a) in any year is equal to the survival rate of age cohort ($a-1$) in the previous year times the difference between the population of age cohort ($a-1$) in the previous year and the sum of the enrolment of the age cohort ($a-1$) in any grade ($g \pm i$) (where $i=0, 1, 2, 3...n$) in the previous year.

The total enrolment in any grade, as noted above, can be composed of pupils from different age cohorts and can be expressed:

(Formula A-3)

$$E_y^{(g)} = \sum_{i=0}^{i=n} E_y^{(a \pm i, g)}$$

which means: enrolment in grade (g) in any year is composed of the sum of the enrolment of all age cohorts ($a \pm i$) (where $i=0, 1, 2, 3...n$) in that grade (g).

Similarly, the total enrolment of any age cohort can be composed of pupils in different grades and can be expressed:

(Formula A-4)

$$E_y^{(a)} = \sum_{i=0}^{i=n} E_y^{(a, g \pm i)}$$

which means: enrolment of age cohort (a) in any year is composed of the sum of the enrolment of that age cohort in any grade ($g \pm i$) (where $i=0, 1, 2, 3...n$).

Enrolment in a grade can also be composed of different types of courses which is generally the case beyond first-level education when specialization takes place. Enrolment in a grade can thus be distributed by type and expressed as follows:

(Formula A-5)

$$E_y^{(g)} = E_y^{(g)} \sum_{i=1}^{i=k} d_y^{(t(i), g)}$$

where: d = distribution proportion of enrolment
 t = any type of education or course
 k = any number independent of n

and where:

$$\sum_{i=1}^{i=k} d_y^{(t(i), g)} = 1.00$$

which means: total enrolment in a grade is equal to the sum of the enrolment in different types of education in that grade. The enrolment in any type of education in a grade, therefore, is equal to a proportion of the total enrolment of all types of education in that grade. The total of all the proportions of the various types of education in the same grade must be equal to 1.00. Consequently, formula A-1 which expresses enrolment by age and grade can be expanded to express enrolment by age, grade and type of education. Thus:

(Formula A-6)

$$E_y^{(t, a, g)} = d_y^{(t, g)} [e_y^{(a, g)} B_y^{(a)} + s_{y-1}^{(a-1)} r_{y-1}^{(g \rightarrow g)} E_{y-1}^{(a-1, g)} + s_{y-1}^{(a-1)} p_{y-1}^{(g-1 \rightarrow g)} E_{y-1}^{(a-1, g-1)} + I_y^{(a, g)} + N_y^{(a, g)}]$$

The enrolment of any type (t) of education in any grade (g) of all ages is therefore:

$$E_y^{(t, g)} = \sum_{i=0}^{i=n} E_y^{(t, a \pm i, g)}$$

which can also be described $E_y^{(t, g)} = d_y^{(t, g)} E_y^{(g)}$ for any type.

Enrolment in a particular type, grade and age can also be expressed in terms of the flow of the age cohort through the educational system as follows:

(Formula A-7)¹

$$E_y^{(t(1), a, g)} = s_{y-1}^{(a-1)} \sum_{i=1}^{i=k} [p_{y-1}^{(t(i), g-1 \rightarrow t(1), g)} E_{y-1}^{(t(i), a-1, g-1)} + r_{y-1}^{(t(i), g \rightarrow t(1), g)} E_{y-1}^{(t(i), a-1, g)}] + I_y^{(t(1), a, g)} + N_y^{(t(1), a, g)}$$

which means: enrolment of pupils of an age-group in a particular type and grade of education in any year is equal to those who were promoted from the previous grade of the same type or any other type of education plus those who repeat the same grade from the previous year of the same type or any other type of education plus the net immigrants and the newcomers of that age-group into that particular type and grade of education.

The planner is as concerned with where pupils go to from a grade and/or type of education as from where they came. There should be a differentiation between those pupils who leave the system without successfully completing the grade (usually considered wastage) and those leaving upon successfully completing the grade (which may be a grade that is not terminal, or a grade that is terminal for a type of education or course).

Enrolment in terms of where pupils are going may be expressed:

(Formula A-8)²

$$E_y^{(t(1), a, g)} = E_y^{(t(1), a, g)} \left[\sum_{i=1}^{i=k} (p_y^{(t(1), g \rightarrow t(i), g+1)} + r_y^{(t(1), g \rightarrow t(i), g)}) + w_y^{(t(1), g)} + I_y^{(t(1), g)} \right]$$

where: w = proportion leaving the system without successful completion of the grade

I = proportion leaving the system with successful completion of the grade

and where:

$$\left[\sum_{i=1}^{i=k} (p_y^{(t(1), g \rightarrow t(i), g+1)} + r_y^{(t(1), g \rightarrow t(i), g)}) + w_y^{(t(1), g)} + I_y^{(t(1), g)} \right] = 1.00$$

which means: enrolment of pupils of an age-group in a particular type and grade of education in any year is composed of the following components:

those who will be promoted to the next grade within the same type or to any other type of education

$$\left[E_y^{(t(1), a, g)} \sum_{i=1}^{i=k} p_y^{(t(1), g \rightarrow t(i), g+1)} \right];$$

those who will repeat the same grade within the same type or in any other type of education

$$\left[E_y^{(t(1), a, g)} \sum_{i=1}^{i=k} r_y^{(t(1), g \rightarrow t(i), g)} \right];$$

1. It will be noted that formula A-7 is essentially the same as formula A-1 with the addition of type-specificity which necessitates the introduction of transfer between types. Moreover, as formula A-7 considers specialized types of education which normally require educational prerequisites it assumes that first-time enrolment, as shown in formula A-1, is equal to zero. If, however, first-time enrolment is to be considered the expression

$$e_y^{(t(1), a, g)} B_y^{(a)}$$

must be added to formula A-7. In the case where students may be promoted from a grade lower than ($g-1$) in the previous year, that is 'skipping' of a grade and/or where students may repeat from a grade lower than (g) in the previous year, formula A-7 may be modified as follows:

$$E_y^{(t(1), a, g)} = s_{y-1}^{(a-1)} \sum_{j=1}^{j=m} \sum_{i=1}^{i=k} \left[p_{y-1}^{(t(i), g-j \rightarrow t(1), g)} E_{y-1}^{(t(i), a-1, g-j)} + r_{y-1}^{(t(i), g+(j-1) \rightarrow t(1), g)} E_{y-1}^{(t(i), a-1, g+(j-1))} \right] + I_y^{(t(1), a, g)} + N_y^{(t(1), a, g)}$$

2. As in formula A-7, in the case where students who repeat may go to a lower grade in the following year and/or students who are promoted may go to a grade higher than ($g+1$) in the following year (that is, 'skipping' of a grade), formula A-8 may be modified as follows:

$$E_y^{(t(1), a, g)} = E_y^{(t(1), a, g)} \left[\sum_{j=1}^{j=n} \sum_{i=1}^{i=k} (p_y^{(t(1), g \rightarrow t(i), g+j)} + r_y^{(t(1), g \rightarrow t(i), g+(1-j))}) + w_y^{(t(1), g)} + I_y^{(t(1), g)} \right]$$

those who will leave the school system without successful completion of the grade

$$[W_y^{(t^{(1)}, a, g)} E_y^{(t^{(1)}, g)}];$$

and those who will leave the school system upon successful completion of the grade

$$[I_y^{(t^{(1)}, a, g)} E_y^{(t^{(1)}, g)}].$$

Enrolment thus far has been shown in terms of age, grade and type of education. Further subdivision is possible for any other category or categories which may be relevant. For example, if sex differentiation is required all the formulae would be expressed separately for each sex and obviously $E_y^{(males)} + E_y^{(females)} = E_y$ for all ages, grades and types. Similarly, subdivision by any defined area within the system, i.e., administrative sub-region, urban-rural, industrial-agricultural, etc., and any desired combination may be used with the proper identification, especially of the movement of pupils between these subdivisions in the educational system. These movements can be handled in a manner conceptually similar to transfer of pupils between types of education as shown in formulae A-7 and A-8.

B. Teacher stock and requirements

The number of teachers needed for teaching in a grade and type of education is determined by:

(Formula B-1)

$$T_y^{(t, g)} = \frac{E_y^{(t, g)}}{f_y^{(t, g)}}$$

where: T = number of teachers needed for teaching, full-time

f = pupil-teacher ratio.

It is assumed in this section that enrolment and teachers are in full-time equivalencies, i.e., E = full-time enrolment, however that is defined in a particular school system and T = full-time teachers, however that is defined.¹ The concept of enrolment used in section A did not and need not have taken this into account.

The teachers needed for teaching in any type and grade or grades in any year may be composed of teachers with various teaching qualifications defined in terms of their educational attainment. This can be expressed:

1. Should there be a difference between the actual number of pupils enrolled and full-time enrolment, it must be converted into full-time equivalents by:

$$E_y^{(t, g)} = \alpha_y^{(t, g)} \dot{E}_y^{(t, g)}$$

where: \dot{E} = enrolment, if it differs from full-time

α = adjustment factor in relation to full-time enrolment

which means: enrolment, full-time equivalent in a type and grade in a year $E_y^{(t, g)}$

is equal to the number of pupils enrolled in that type and grade in that year, if it differs from full-time $\dot{E}_y^{(t, g)}$

multiplied by the adjustment factor in relation to full-time-study. In other words, part-time students would result in a factor less than 1.00 and students taking more than the defined full-time study would result in a factor greater than 1.00. α therefore is the net effect of these factors upon total enrolment and $\alpha \leq 1.00$.

Should there be a difference between the actual number of teachers teaching and full-time teachers, it must be converted into full-time equivalents by:

$$T_y^{(t, g)} = \gamma_y^{(t, g)} \dot{T}_y^{(t, g)}$$

where: \dot{T} = number of teachers needed for teaching, if it differs from full-time

γ = adjustment factor in relation to full-time teachers.

The meaning is analogous to that for \dot{E} and α .

Full-time teacher equivalent as expressed in formula B-1, that is, the number of full-time equivalent pupils divided by the pupil-teacher ratio, again in full-time normal equivalent terms, does not take explicitly into account eventual changes in the normal teaching load, nor the normal amount of teaching (full-time) received by pupils (full-time) as determined by curriculum. Implicitly, of course, changes in the pupil-teacher ratio reflect this. If, however, important changes are envisaged it would be more exact to take them into account explicitly and instead of using the pupil-teacher ratio the adjusted pupil-teacher ratio could be used. According to formula B-1:

$$f_y^{(t, g)} = \frac{E_y^{(t, g)}}{T_y^{(t, g)}}$$

The adjusted pupil-teacher ratio, however, would be:

$$f_y^{(t, g)} = \frac{\xi_y^{(t, g)} E_y^{(t, g)}}{\varphi_y^{(t, g)} T_y^{(t, g)}}$$

where: f = adjusted pupil-teacher ratio
 ξ = average time units of teaching received per full-time pupil
 φ = average time units of teaching given per full-time teacher.

If f is to be used instead of f formula B-1 naturally would be:

$$T_y^{(t, g)} = \frac{\xi_y^{(t, g)} E_y^{(t, g)}}{\varphi_y^{(t, g)} f_y^{(t, g)}}$$

It must be stressed, however, that when the values for ξ and φ are to be taken into account explicitly (as opposed to where they are implicitly accounted for in formula B-1), the expression shown must be used in all cases where pupil-teacher ratios are used.

(Formula B-2)

$$T_y^{(t, g)} = T_y^{(t, g)} \sum_{i=1}^{i=k} \hat{d}_y^{(i^{(t)})}$$

where: \hat{d} = distribution proportion of teachers by qualification

\hat{i} = type and level of education or course completed by teachers

and where:

$$\sum_{i=1}^{i=k} \hat{d}_y^{(i^{(t)})} = 1.00.$$

The number of teachers needed for teaching in any type of grade or grades with a given qualification (type and level of education or course completed by teachers) is, therefore:

$$T_y^{(t, g, i)} = \hat{d}_y^{(i)} T_y^{(t, g)}.$$

The number of additional teachers required for teaching in a particular type and grade of education in any year is the difference between the total number of teachers needed for teaching that type and grade and the number left in the system from the previous year who are available for teaching that type and grade. The number of additional teachers required can thus be expressed:

(Formula B-3)¹

$$R_y^{(t^{(1)}, g)} = \frac{E_{y-1}^{(t^{(1)}, g)}}{f_y^{(t^{(1)}, g)}} - s_{y-1} \left[\frac{E_{y-1}^{(t^{(1)}, g)}}{f_{y-1}^{(t^{(1)}, g)}} + \sum_{i=1}^j \sum_{j=0}^n h_{y-1}^{(t^{(i+1)}, g \pm j \rightarrow t^{(1)}, g)} \frac{E_{y-1}^{(t^{(i+1)}, g \pm j)}}{f_{y-1}^{(t^{(i+1)}, g \pm j)}} \right] + \frac{E_{y-1}^{(t^{(1)}, g)}}{f_{y-1}^{(t^{(1)}, g)}} \left[b_{y-1}^{(t^{(1)}, g)} + \zeta_{y-1}^{(t^{(1)}, g)} + \sum_{i=1}^j \sum_{j=0}^n h_{y-1}^{(t^{(1)}, g \rightarrow t^{(i+1)}, g \pm j)} \right]$$

where: R = number of additional teachers needed for teaching, full-time

h = transfer rate within the teaching profession

b = retirement rate of teachers

ζ = school system leaving rate, other than retirement.

Just as the teachers needed for teaching in any type and grade in any year may be composed of teachers with various qualifications (see formula B-2), the additional

teachers required for teaching in any type and grade in any year may also be composed of teachers with various qualifications and may be expressed:

(Formula B-4)

$$R_y^{(t, g)} = R_y^{(t, g)} \sum_{i=1}^{i=k} \hat{d}_y^{(i^{(t)})}$$

where, again:

$$\sum_{i=1}^{i=k} \hat{d}_y^{(i^{(t)})} = 1.00.$$

C. Enrolment in teacher-training institutions

The enrolment in teacher-training institutions should correspond to the requirement for teachers of the specific qualification provided by those institutions. More precisely, graduation from teacher-training institutions giving a specific qualification in a given year should be sufficient to supply the additional teachers needed with that specific qualification in the following year, taking into account, on the one hand, that all graduates do not necessarily enter teaching and, on the other hand, all additional teachers do not necessarily come directly from teacher-training institutions. This may be expressed:

(Formula C-1)

$$E_y^{(TTR, \hat{g})} \frac{[1 - q_{y+1}^{(TTR, \hat{g})}] R_{y+1}^{(TTR, \hat{g})}}{s_y l_y^{(TTR, \hat{g})} [1 - \sigma_y^{(TTR, \hat{g})}]}$$

where:

TTR = a specific type of teacher-training course

\hat{g} = terminal grade

q = proportion of additional teachers not coming directly from teacher-training institutions

σ = proportion of graduates not entering the profession

1. Formula B-3 assumes that the factors affecting the number of additional teachers in a given year are type and grade-specific. That is, it assumes that transfer rates, retirement rates, school system leaving rates and survival rates are the same for teachers in a given type and grade irrespective of the teachers' qualifications. These factors may, however, be related to the qualifications of teachers as well. In the same type and grade, teachers with a particular qualification may, for example, have a transfer rate significantly different from those possessing another qualification. If this situation is relevant formula B-3 should be used separately for each teacher-qualification group.

and where $R_{y+1}^{(TTR, \theta)}$ is equal to the total requirement in year $y+1$ of additional teachers with that type of teacher-training course for teaching in all types and grades.

It will be noted that in this case enrolment is determined not on the basis of a progression from lower to higher grades in subsequent years but on the basis of a desired output to fit a determined manpower demand, i.e., teachers. In this sense the enrolment in the terminal grade of the type relevant to the manpower demand is determined. Enrolment in lower grades in previous years must thus be related to the enrolment in the terminal grade and in the year for which the output is required.

Enrolment, of course, is affected by a multitude of factors which the planning process cannot ignore. Some of these factors may be viewed as determining flows of populations through the school system, from grade to grade and year to year. Some factors, on the other hand, may be viewed as deciding the output from the system as determined by manpower demand. Both types of factors do operate and their implications must be taken into account in the planning process. Naturally, when one set of factors operate to affect enrolment magnitudes in one direction and a different set of factors operate in another direction which also affects enrolment magnitudes, the planner should be in a position to reconcile them so that they are in the balance desired. If one first calculates flows of students on the basis of educational criteria enrolment magnitudes can be obtained for all grades and types of education. If, in addition, one calculates enrolment in types and grades in terms of output desired conforming to manpower demand, enrolment magnitudes for the types and grades relevant can also be obtained. If these two approaches are used independently they will most likely result in different enrolment magnitudes for some types and grades of education.

The planner, with the aid of the techniques illustrated in this Model, can be in a position to observe the quantitative implications of these factors and, thereby, the magnitude of discrepancy due to the hypotheses used. It then becomes possible to adjust these hypotheses to achieve the desired objectives. The adjustments themselves can be hypothesized on the basis of quantified implications, that is, using rapid computers for which the Model is intended affords the planner the opportunity of 'testing' the quantitative results of a series of alternatives. It also permits the planner to concentrate his attention on certain types of education while at the same time receiving

results concerning the entire system and the relationship to the entire system of the types with which he may be working. Thus the process of educational planning becomes one of step-by-step approximations with quantification.

Formula C-1 determines enrolment for a specific type and grade (the terminal grade of that type) based on the desired output. This particular type and grade enrolment can be related to over-all enrolment in that particular grade by using formula A-5 in the form

$$d_y^{(TTR, \theta)} = \frac{E_y^{(TTR, \theta)}}{E_y^{(g)}}$$

and where the sum of the values of all the proportions of enrolment in that grade other than $d^{(TTR, \theta)}$ is equal to

$$[1.00 - d_y^{(TTR, \theta)}].$$

Continuing the approach of computing enrolment in a specific type related to a manpower (output) demand, in this case, teacher output demand and teacher-training enrolment, once the enrolment for the terminal grade is known enrolment in preceding grades can be expressed:

(Formula C-2)

$$E_y^{(TTR, \theta-1)} = \frac{E_{y+1}^{(TTR, \theta)}}{s_y^{(TTR, \theta-1)} p_y^{(TTR, \theta-1 \rightarrow TTR, \theta)}} - \frac{[s_y^{(TTR, \theta)} p_y^{(TTR, \theta \rightarrow TTR, \theta)} E_y^{(TTR, \theta)} + I_{y+1}^{(TTR, \theta)} + N_{y+1}^{(TTR, \theta)}]}{s_y^{(TTR, \theta-1)} p_y^{(TTR, \theta-1 \rightarrow TTR, \theta)}}$$

where transfers to $E_{y+1}^{(TTR, \theta)}$ are, for simplicity, not considered.

Formulae C-1 and C-2 give values for enrolment in a specific type of teacher-training institution which are directly related to the demand for additional teachers coming into the educational system for the first time with the qualification given by this specific type of teacher-training institution.

Another educational activity designed to re-train or up-date existing teachers is commonly referred to as in-service training of teachers. When a regular programme of such training exists or is assumed it can be expressed:

(Formula C-3)

$$E_y^{(INS)} = \eta_y^{(t, g)} [T_y^{(t, g)} - \varrho_y^{(t, g)} R_y^{(t, g)} - \sum_{i=1}^{i=\omega} s_{y-i} \\ (1 - h_{y-i}^{(t, g)} - b_{y-i}^{(t, g)} - \zeta_{y-i}^{(t, g)}) E_{y-i}^{(INS)}] + \dot{\eta}_y^{(t, g)} \varrho_y^{(t, g)} R_y^{(t, g)}$$

where:

\widehat{INS} = a specific type of in-service training course for teachers

η = proportion of teachers to receive a specific type of in-service training course

$\dot{\eta}$ = proportion of additional teachers to receive a specific type of in-service training course

ω = the length of time between cycles of in-service training

which means: enrolment in in-service training is a proportion of teachers who did not have in-service training in the last period (this period being equal to the length of time between cycles of in-service training) plus a proportion of additional teachers who do not come directly from teacher-training institutions.

If, however, in-service training is obligatory the value of $\eta = 1.00$. In that case $\dot{\eta}$ is unnecessary since all of the teachers eligible, as defined, would receive in-service training.

D. Literacy and adult education

Literacy and adult education should be viewed in relation to school education. Literacy, itself, is commonly defined, for comparative purposes, in terms of the number of years of school education successfully completed. This type of definition is especially useful in estimating the number of adult illiterates when census data are not available and in between census periods. For the purpose of this Model the assumption is made that the number of adult illiterates is known (or estimated) at some period and that changes in this number are related to the number of persons reaching adulthood with less than the number of years of school education successfully completed that is defined as achievement of literacy. The number of illiterates is also dependent upon the number of adult illiterates becoming literate and the number of adult literates becoming illiterate.

At any point in time a population might be viewed as being composed of literates and illiterates:

(Formula D-1)

$$\sum_{i=0}^{i=n} P_y^{(\hat{a}+i)} = \sum_{i=0}^{i=n} [Z_y^{(\hat{a}+i)} + M_y^{(\hat{a}+i)}]$$

where: \hat{a} = beginning age of adulthood

Z = number of illiterates

M = number of literates.

The number of illiterates in any year may be expressed:

(Formula D-2)

$$\sum_{i=0}^{i=n} Z_y^{(\hat{a}+i)} = \sum_{i=0}^{i=n} [s_{y-1}^{(\hat{a}+i)} [(1 - \tau_{y-1}^{(\hat{a}+i)}) Z_{y-1}^{(\hat{a}+i)} + \varepsilon_{y-1}^{(\hat{a}+i)} M_{y-1}^{(\hat{a}+i)}] + J_y^{(\hat{a}+i)}] - Z_y^{(\hat{a}+n+1)} + Z_y^{(\hat{a})}$$

where: τ = proportion of illiterates becoming literate
 ε = proportion of literates becoming illiterate
 J = net illiterate immigrants into the population, i.e., on a national level those illiterates coming from other countries less those going to other countries

which means: the number of adult illiterates in any year is equal to the number of adult illiterates in the previous year who survive and who did not become literate during that period plus those who were literate in the previous year and who survive who become illiterate during that period less those illiterates passing out of the age-group covered plus those reaching the beginning age of adulthood who are illiterate.

In order to estimate the number of those reaching the beginning age of adulthood, who are illiterate, in the absence of annual census estimates for the planning period, a structural definition related to the school education of those new adults can be employed.

(Formula D-3)

$$Z_y^{(\hat{a})} = B_y^{(\hat{a})} + \sum_{i=\hat{a}-m}^{j=k} s_{y-i}^{(\hat{a}-i)} (w_{y-i}^{(\hat{a}-i, g^{(j)})} E_{y-i}^{(\hat{a}-i, g^{(j)})}) + \sum_{i=\hat{a}-m}^{j=k-1} s_{y-i}^{(\hat{a}-i)} (l_{y-i}^{(\hat{a}-i, g^{(j)})} E_{y-i}^{(\hat{a}-i, g^{(j)})}) - \sum_{i=\hat{a}-(m+1)}^{j=k} s_{y-i}^{(\hat{a}-i)} N_{y-i}^{(\hat{a}-i, g^{(j)})}$$

where: m = school-entering age

k = grade at which literacy is achieved

which means: the number of new adult illiterates in any year is equal to the population in the beginning age of adulthood who have never been to school plus those who have been enrolled but who left the school system before

successfully completing the grade at which literacy is achieved.

Enrolment in literacy courses may be expressed for any adult age-group in a fashion similar to that for enrolment in school education (see formula A-1), thus:

(Formula D-4)

$$E_y^{(a+n, \widehat{LIT}, g)} = e_y^{(a+n, \widehat{LIT}, g)} \dot{Z}_y^{(a+n, \widehat{LIT}, g)} + s_{y-1}^{(a+n-1)} [r_{y-1}^{(\widehat{LIT}, g \rightarrow \widehat{LIT}, g)} E_{y-1}^{(a+n-1, \widehat{LIT}, g)} + p_{y-1}^{(\widehat{LIT}, g-1 \rightarrow \widehat{LIT}, g)} E_{y-1}^{(a+n-1, \widehat{LIT}, g-1)}] + N_y^{(a+n, \widehat{LIT}, g)}$$

where:

\widehat{LIT} = literacy courses

\dot{Z} = illiterate population not previously enrolled in literacy courses.

The illiterate population not previously enrolled in literacy courses (\dot{Z}) is expressed by:

(Formula D-5)

$$\dot{Z}_y^{(a+n)} = s_{y-1}^{(a+n-1)} \left[Z_{y-1}^{(a+n-1)} - \sum_{i=0}^{i=k} E_{y-1}^{(a+n-1, \widehat{LIT}, g \pm i)} \right]$$

Obviously when the literacy course is not longer than one year, formula D-4 will have the form:

$E_y^{(a+n, \widehat{LIT})} = e_y^{(a+n, \widehat{LIT})} Z_y^{(a+n, \widehat{LIT})}$ and since there would be no grades, $Z_y = \dot{Z}_y$.

Teacher requirements for literacy may be computed in exactly the same manner as for school education (see formulae B-1, B-2, B-3 and B-4).

Other types of adult education including in-service training and re-training other than for teachers can be treated in a manner similar to literacy training.

Enrolment in any particular type of adult education is thus:

(Formula D-6)

$$E_y^{(ADT, g)} = e_y^{(ADT, g)} B_y^{(ADT, g)} + s_{y-1} [r_{y-1}^{(ADT, g \rightarrow g)} E_{y-1}^{(ADT, g)} + p_{y-1}^{(ADT, g-1 \rightarrow g)} E_{y-1}^{(ADT, g-1)}] + N_y^{(ADT, g)}$$

where: ADT = a particular type of adult education.

The population relevant for a type of adult education, who have not previously been enrolled in that type of adult education ($B_y^{(ADT, g)}$) is expressed by:

(Formula D-7)

$$B_y^{(ADT, g)} = s_{y-1} \left[P_{y-1}^{(\psi)} - \sum_{i=0}^{i=n} E_{y-1}^{(ADT, g \pm i)} \right]$$

where: ψ = criteria defining the population relevant for adult education.

Teacher requirements for any type of adult education can be expressed in a manner similar to that for school education (see formulae B-1, B-2, B-3 and B-4).

E. Costs

Total costs comprise recurring and capital costs. Both these categories are in themselves totals of costs for various sub-categories which should be costed individually. Recurring costs, therefore, may be expressed as follows:

(Formula E-1)

$$v_y^{(t, g)} = \widehat{va}_y^{(t, g)} + \widehat{vb}_y^{(t, g)} + \widehat{vc}_y^{(t, g)} + \widehat{vd}_y^{(t, g)} + \widehat{ve}_y^{(t, g)} + \widehat{vf}_y^{(t, g)} + \widehat{vg}_y^{(t, g)} + \widehat{vh}_y^{(t, g)} + \widehat{vi}_y^{(t, g)}$$

where: v = per-pupil recurring cost
 \widehat{va} = per-pupil teacher-salary cost
 \widehat{vb} = per-pupil personnel cost, other than teacher-salary cost
 \widehat{vc} = per-pupil cost of general administration
 \widehat{vd} = per-pupil cost of maintenance and operation of educational establishments
 \widehat{ve} = per-pupil cost of books
 \widehat{vf} = per-pupil welfare cost (school meals, etc.)
 \widehat{vg} = per-pupil auxiliary cost (transportation, etc.)
 \widehat{vh} = per-pupil scholarship and stipend cost
 \widehat{vi} = per-pupil cost of instructional materials, other than books.

The per-pupil costs for the items shown in formula E-1 are, of course, type and grade specific. As such they are actually averages of the gross costs divided by the enrolment. Thus, for example, \widehat{va} is equal to the total teacher-salary costs for a type-grade divided by the enrolment in that type-grade, and so forth. For projections, however, it is more likely that type-grade information is more readily available concerning the cost in unit terms not of the pupil but of the teacher. It may also be the case that information exists as to the per-pupil cost of some items

but that all pupils in the type-grade are not covered by that item. The per-pupil cost of books for pupils who receive books in a type-grade may, for example, be known but only a proportion of pupils in that type-grade may receive books. In cases such as these it would be more convenient to deal with some of the items used in formula E-1 individually in order to obtain the average per-pupil values for a type-grade needed for Formula E-1, thus:

(Formula E-2)

$$\widehat{va}_y^{(t,g)} = \frac{F_y^{(t,g)}}{f_y^{(t,g)}}$$

where: F = average teacher salary

and:

(Formula E-3)

$$\widehat{ve}_y^{(t,g)} = \widehat{ve}_y^{(t,g)} \mu_y^{(t,g)}$$

where: \widehat{ve} = per-pupil cost of books for pupils receiving books

μ = proportion of pupils receiving books

and:

(Formula E-4)

$$\widehat{vf}_y^{(t,g)} = \widehat{vf}_y^{(t,g)} \dot{\mu}_y^{(t,g)}$$

where: \widehat{vf} = per-pupil welfare cost for pupils receiving welfare

$\dot{\mu}$ = proportion of pupils receiving welfare

and:

(Formula E-5)

$$\widehat{vg}_y^{(t,g)} = \widehat{vg}_y^{(t,g)} v_y^{(t,g)}$$

where: \widehat{vg} = per-pupil auxiliary cost for pupils receiving auxiliary services

v = proportion of pupils receiving auxiliary services

and:

(Formula E-6)

$$\widehat{vh}_y^{(t,g)} = \widehat{vh}_y^{(t,g)} \dot{v}_y^{(t,g)}$$

where: \widehat{vh} = per-pupil scholarship and stipend cost for pupils receiving scholarships and stipends

\dot{v} = proportion of pupils receiving scholarships and stipends

In cases where other cost items are important or where accounting systems lead to classification of items different from those shown in formula E-1 they can be used in the same manner. Total recurring costs are merely:

(Formula E-7)

$$V_y^{(t,g)} = v_y^{(t,g)} E_y^{(t,g)}$$

where: V = total recurring costs.

Formulae E-1 and E-7, with the proper notations of the relevant items are applicable to all forms of education, i.e., school and adult. In obtaining total recurring costs, either for a type-grade or for a combination of some or all type-grades, cost items which may not be obtainable by type-grade, such as central administration, must be added to the relevant recurring cost total.

Capital costs may be divided into three categories: capital costs for schools, for student residences and for teacher residences. Each of these may be expressed in unit terms. Thus, for schools the cost in per-pupil-place terms is:

(Formula E-8)

$$u_y^{(t,g)} = \widehat{ca}_y^{(t,g)} \widehat{qa}_y^{(t,g)} + \widehat{cb}_y^{(t,g)} \widehat{qb}_y^{(t,g)} + \widehat{cc}_y^{(t,g)} \widehat{qc}_y^{(t,g)} + \widehat{cd}_y^{(t,g)} \widehat{qd}_y^{(t,g)} + \widehat{ce}_y^{(t,g)} \widehat{qe}_y^{(t,g)} + \widehat{ub}_y^{(t,g)} + \widehat{uc}_y^{(t,g)} + \widehat{ud}_y^{(t,g)} + \widehat{ue}_y^{(t,g)}$$

where: u = per-pupil-place capital cost for schools

\widehat{ca} = cost of site per unit area for schools (land and 'additional' costs)¹

\widehat{cb} = cost per unit area for building teaching and common facilities

1. 'Additional' costs may be defined as those costs of a building composed of:

- (a) drainage works beyond the manholes immediately adjacent to the school or residence;
- (b) roads, paths and hard areas for informal games (other than games areas prescribed in the building regulations);
- (c) water, gas and electric mains (from meter point in building to connexion with the existing supply);
- (d) site layout and planting;
- (e) boundary walls and fencings;
- (f) playing field preparation, including excavation;
- (g) caretaker's house (including drainage);
- (h) cycle sheds, greenhouses, etc. (if physically detached from the main school building or buildings);
- (i) other unusual items, such as electricity sub-stations, sewage disposal plants, etc.;
- (j) any contingency sum allocated to the above;
- (k) the proportion of preliminaries and insurances allocated to the above;
- (l) design and architectural fees, in connexion with the above items.

- \widehat{cc} = cost per unit area for building laboratories
 \widehat{cd} = cost per unit area for building auditoria and gymnasia
 \widehat{ce} = cost per unit area for building workshops and other special school facilities
 \widehat{qa} = per-pupil-place area requirements for site for schools
 \widehat{qb} = per-pupil-place area requirements for teaching and common facilities
 \widehat{qc} = per-pupil-place area requirements for laboratories
 \widehat{qd} = per-pupil-place area requirements for auditoria and gymnasia
 \widehat{qe} = per-pupil-place area requirements for workshops and other school facilities
 \widehat{ub} = cost per pupil-place for furniture and equipment, etc., for teaching and common facilities
 \widehat{uc} = cost per pupil-place for furniture and equipment, etc., for laboratories
 \widehat{ud} = cost per pupil-place for furniture and equipment, etc., for auditoria and gymnasia
 \widehat{ue} = cost per pupil-place for furniture and equipment, etc., for workshops and other school facilities.

Similarly for student residences, the cost, in per-resident-place terms, is:

(Formula E-9)

$$\dot{u}_y^{(t,g)} = \widehat{cf}_y^{(t,g)} \widehat{qf}_y^{(t,g)} + \widehat{cg}_y^{(t,g)} \widehat{qg}_y^{(t,g)} + \widehat{ch}_y^{(t,g)} \widehat{qh}_y^{(t,g)} + \widehat{uf}_y^{(t,g)} + \widehat{ug}_y^{(t,g)} + \widehat{uh}_y^{(t,g)}$$

where: \dot{u} = per-resident-place capital cost for student residences

- \widehat{cf} = cost of site per unit area for student residences (land, and 'additional' costs)¹
 \widehat{cg} = cost per unit area for building student-residence bedrooms and dormitories
 \widehat{ch} = cost per unit area for building student-residence common facilities, including kitchens, dining-rooms and service facilities
 \widehat{qf} = per-resident-place area requirements for site for student residences
 \widehat{qg} = per-resident-place area requirements for student-residence bedrooms and dormitories

- \widehat{qh} = per-resident-place area requirements for student-residence common facilities including kitchens, dining-rooms and service facilities
 \widehat{ug} = cost per resident-place for furniture and equipment, etc., for student-residence bedrooms and dormitories
 \widehat{uh} = cost per resident-place for furniture and equipment, etc., for student-residence common facilities, including kitchens, dining-rooms and service facilities.

For teacher residences, the cost, in per-resident-place terms, is:

(Formula E-10)

$$\bar{u}_y^{(t,g)} = \widehat{ci}_y^{(t,g)} \widehat{qi}_y^{(t,g)} + \widehat{cj}_y^{(t,g)} \widehat{qj}_y^{(t,g)} + \widehat{uj}_y^{(t,g)}$$

where: \bar{u} = per-resident-place capital cost for teacher residences

- \widehat{ci} = cost of site per unit area for teacher residences (land, and 'additional' costs)¹
 \widehat{cj} = cost per unit area for building teacher residences
 \widehat{qi} = per-resident-place area requirements for site for teacher residences
 \widehat{qj} = per-resident-place area requirements for teacher residence buildings
 \widehat{uj} = cost per resident-place for furniture and equipment, etc., for teacher residences.

Total capital costs are therefore the sum of the costs for the three categories, thus:

(Formula E-11)

$$U_y^{(t,g)} = u_y^{(t,g)} Q_y^{(t,g)} + \dot{u}_y^{(t,g)} \dot{Q}_y^{(t,g)} + \bar{u}_y^{(t,g)} \bar{Q}_y^{(t,g)}$$

where: U = total capital costs
 Q = number of pupil-places to be built
 \dot{Q} = number of resident-places to be built for students
 \bar{Q} = number of resident-places to be built for teachers.

The computation of the number of places to be built (Q , \dot{Q} and \bar{Q}) in any year would be simple indeed if it could be assumed that the building period were one year.

1. See note on page 35.

In that case it would be equal to the requirements for the following year less the existing stock that will be available in the following year. In reality, however, building programmes must take into account that the time for building may be phased and may vary among different categories of buildings, even within the same type of education, i.e., some buildings, even with the same capacity, might take either one, two, three or more years before they are available.

Since Q_y , \dot{Q}_y and \bar{Q}_y in formula E-11 denote the number of places (or its equivalent in building terms) to be built in a given year y and since the building time may vary, Q_y , \dot{Q}_y and \bar{Q}_y may include the building of places that should be available in years $y+1$, $y+2$, $y+3$, etc. While Q_y , \dot{Q}_y and \bar{Q}_y are equal to the amount of building, in unit-place equivalents, that will take place in a given year y , the number of places to be completed in any subsequent year, for the three categories, are,

for schools:

(Formula E-12)

$$D_y^{(t,g)} = E_{y+1}^{(t,g)} - (1 - x_y^{(t,g)}) E_y^{(t,g)}$$

where: D = number of pupil-places to be completed for the following year

x = proportion of existing pupil-places to be replaced for the following year

and, for student residences:

(Formula E-13)

$$\dot{D}_y^{(t,g)} = \pi_{y+1}^{(t,g)} E_{y+1}^{(t,g)} - (1 - \dot{x}_y^{(t,g)}) \pi_y^{(t,g)} E_y^{(t,g)}$$

where: \dot{D} = number of resident-places for students to be completed for the following year

π = proportion of students in student residences

\dot{x} = proportion of existing resident-places for students to be replaced for the following year

and, for teacher residences:

(Formula E-14)

$$\bar{D}_y^{(t,g)} = \bar{\pi}_{y+1}^{(t,g)} T_{y+1}^{(t,g)} - (1 - \bar{x}_y^{(t,g)}) \bar{\pi}_y^{(t,g)} T_y^{(t,g)}$$

where: \bar{D} = number of resident-places for teachers to be completed for the following year

$\bar{\pi}$ = proportion of teachers in teacher residences

\bar{x} = proportion of existing resident-places for

teachers to be replaced for the following year.

Obviously, if all building took one year to complete then

$$D_y^{(t,g)} = Q_y^{(t,g)} \text{ and } \dot{D}_y^{(t,g)} = \dot{Q}_y^{(t,g)} \text{ and } \bar{D}_y^{(t,g)} = \bar{Q}_y^{(t,g)} \text{ which}$$

might more often be the case for primary education.

However, if this condition cannot be assumed, the number of places to be completed for the following year should be specified according to the proportion of places which require one, two, three, etc., years to build. Assuming that all building will require one, two or three years to complete, this can be expressed for schools, as follows:

(Formula E-15)

$$D_y^{(t,g)} = [\beta_y^{(t,g)} + \dot{\beta}_y^{(t,g)} + \bar{\beta}_y^{(t,g)}] D_y^{(t,g)}$$

where: β = proportion of pupil-places requiring one year to complete

$\dot{\beta}$ = proportion of pupil-places requiring two years to complete

$\bar{\beta}$ = proportion of pupil-places requiring three years to complete and, obviously,

$$\beta_y^{(t,g)} + \dot{\beta}_y^{(t,g)} + \bar{\beta}_y^{(t,g)} = 1.00.$$

If four or more years are necessary the formula may easily be expanded accordingly. The amount of building in any year as measured in unit-place equivalent terms can now be shown as follows, assuming that all building will require one, two or three years to complete.

(Formula E-16)

$$Q_y^{(t,g)} = \theta_y^{(t,g)} D_y^{(t,g)} + \dot{\theta}_y^{(t,g)} \dot{\beta}_{y+1}^{(t,g)} D_{y+1}^{(t,g)} + \bar{\theta}_y^{(t,g)} \bar{\beta}_{y+1}^{(t,g)} D_{y+1}^{(t,g)}$$

$$D_y^{(t,g)} + \delta_y^{(t,g)} \bar{\beta}_{y+2}^{(t,g)} D_{y+2}^{(t,g)} + \dot{\delta}_y^{(t,g)} \bar{\beta}_{y+1}^{(t,g)} D_{y+1}^{(t,g)} +$$

$$+ \bar{\delta}_y^{(t,g)} \bar{\beta}_y^{(t,g)} D_y^{(t,g)}$$

where: θ = proportion of first-year building of pupil-places requiring two years to complete

$\dot{\theta}$ = proportion of second-year building of pupil-places requiring two years to complete

δ = proportion of first-year building of pupil-places requiring three years to complete

$\dot{\delta}$ = proportion of second-year building of pupil-places requiring three years to complete

$\bar{\delta}$ = proportion of third-year building of pupil-places requiring three years to complete

and where:

$$\theta_y^{(t,g)} + \theta_{y+1}^{(t,g)} = 1.00,$$

and

$$\theta_{y-1}^{(t,g)} + \theta_y^{(t,g)} = 1.00,$$

and

$$\delta_y^{(t,g)} + \delta_{y+1}^{(t,g)} + \delta_{y+2}^{(t,g)} = 1.00,$$

and

$$\delta_{y-1}^{(t,g)} + \delta_y^{(t,g)} + \delta_{y+1}^{(t,g)} = 1.00,$$

and

$$\delta_{y-2}^{(t,g)} + \delta_{y-1}^{(t,g)} + \delta_y^{(t,g)} = 1.00.$$

For student residences and teacher residences, formulae E-15 and E-16 are identical with relevant values for β , $\hat{\beta}$, $\bar{\beta}$, θ , $\hat{\theta}$, δ , $\hat{\delta}$, and $\bar{\delta}$ for student-residence building and teacher-residence building.

Formula E-12 which describes the number of pupil-places to be completed for the following year assumes that a full-time pupil occupies one pupil-place in a school, that is, a full one-shift basis. There may, however, be variants from the concept of a full one-shift utilization of pupil-places, especially in some types of education. For example, a certain type of education or a proportion of enrolment within a certain type may function on a full two-shift basis, that is, two full-time students on a two-shift basis may require only one pupil-place. This may be taken into account by the utilization factor which may operate in either direction, i.e., under- or over-utilization of pupil-places. The deviation from a utilization factor of 1.00 (a full one-shift) may be relevant for an entire type of education or any proportion of enrolment. It can be expressed as an adjustment to formula E-12 as follows:

(Formula E-17)

$$\hat{D}_y^{t,g} = \frac{E_{y+1}^{(t,g)}}{\lambda_{y+1}^{(t,g)}} - \frac{(1 - x_y^{(t,g)}) E_y^{(t,g)}}{\lambda_y^{(t,g)}}$$

where: \hat{D} = number of pupil-places to be completed for the following year adjusted by the utilization factor.

λ = utilization factor in relation to full one-shift utilization of pupil-places.

Further calculations using D when taking into account the utilization factor will simply substitute \hat{D} for D (see formulae E-15 and E-16) so that Q is in utilization-rate-adjusted terms in formula E-6. Naturally, this utilization factor is not relevant for residences.

Total costs in any year would be:

(Formula E-18)

$$W_y^{(t,g)} = V_y^{(t,g)} + U_y^{(t,g)}$$

where: W = total costs.

Required values

Constant: k, ω, ζ ;

for base year: Z ;

for base year, all relevant ages, types and grades: E ;

for all relevant years and ages: J, P, s, e, τ ;

for all relevant years, types and grades:

$F; b; \bar{c}a; \bar{c}b; \bar{c}c; \bar{c}d; \bar{c}e; \bar{c}f; \bar{c}g; \bar{c}h; \bar{c}i; \bar{c}j; d; \hat{d};$
 $f; h; l; p; \bar{q}a; \bar{q}b; \bar{q}c; \bar{q}d; \bar{q}e; \bar{q}f; \bar{q}g; \bar{q}h;$
 $\bar{q}i; \bar{q}j; r; \bar{u}b; \bar{u}c; \bar{u}d; \bar{u}e; \bar{u}g; \bar{u}h; \bar{u}j; \bar{v}b; \bar{v}c; \bar{v}d;$
 $\bar{v}e; \bar{v}f; \bar{v}g; \bar{v}h; \bar{v}i; w; x; \dot{x}; \bar{x}; \alpha; \beta; \hat{\beta}; \bar{\beta}; \gamma; \delta;$
 $\hat{\delta}; \bar{\delta}; \eta; \hat{\eta}; \theta; \hat{\theta}; \lambda; \mu; \hat{\mu}; \xi; \pi; \hat{\pi}; \varrho; \sigma; \nu; \hat{\nu}; \phi.$

For all relevant years, ages, types and grades: $I, N, e.$

Approach to projections

Grouping of countries in the region

The countries in the region have, on the one hand, many problems in common arising out of their needs and aspirations for development and, on the other hand, they represent a fairly wide range of variations in the levels of educational and general development that they have reached. The Meeting of Ministers of Education held in Tokyo drew attention to this and said: 'Although we are at various stages of educational and economic development, most of us hope to achieve the target of at least seven years of primary education by 1980, some of us will achieve it earlier, while others will complete the first phase of 4-5 years' compulsory schooling within this decade.'

In the context of the above statement, the position reached by the countries in the region in regard to enrolment in the first seven grades is set out in Table 16. For facility of presenting the enrolments on a common scale, Grades I-VII have been taken to correspond to the age-group 6-12, irrespective of whether any of the upper grades (V, VI and VII) occur independently or as part of

TABLE 16. First-level enrolment and enrolment ratios, 1964

Country	Population (age-group 6-12) ¹ (thousands)	Enrolment (Grades I-VII) ¹ (thousands)	Enrolment ratio ² (%)
Afghanistan	2 447	322	13
Nepal	1 793	366	20
Laos	484	148	31
Pakistan	22 253	8 148	37
Iran	4 223	2 172	51
Burma	4 143	2 168	52
Indonesia	21 578	11 938	55
Viet-Nam, Republic of	3 068	1 730	56
Cambodia	1 238	718	58
India	85 192	54 202	64
Mongolia	174	129	74
Thailand	6 044	4 500	75
Malaya ³	1 814	1 486	82
Ceylon	2 189	1 977	90
Korea, Republic of	5 440	4 963	91
Singapore	390	378	97
Philippines	6 160	6 048	98
China, Republic of	2 425	2 377	98

1. Population data are based on interpolations of the 1960 and 1965 estimates of the school-age population by single years of age derived by applying Sprague multipliers to the national data distributed by five-year age-groups. (For sources of the population estimates, see Appendix A.)

Enrolment data are based on national estimates by individual grade of enrolment and rearranged to agree with the pattern of seven years of primary schooling.

2. Enrolment ratio is the enrolment in the first seven grades as a proportion of the population in age-group 6-12 in 1964.

3. Including Sabah and Sarawak.

a primary school or form the lower grades in a secondary school.

The future growth of an educational system depends to a considerable extent on the enrolment in the first level of education. Table 16 shows the different levels that the countries have reached and which form the base for the future tasks. In order to present an integrated picture of educational development in Asia up to 1980, it is necessary to take into account these varying levels of development and the consequent patterns and rates of likely future growth. The projections of educational development in Asia have therefore been constructed by first considering together countries which by 1980 will achieve broadly comparable levels of educational development, and then combining the projections obtained for groups of countries into the total picture for the region. It is to be emphasized that grouping of countries is no more than a device for constructing projections more closely related to their specific situation and for identifying the broad patterns of their educational needs in the immediate years ahead.

It is used only to facilitate visualization of educational development in the region as a whole in a way that also takes account of the variety of needs and prospects of the countries. To the extent that any country decides that its development of education is suboptimal and increases investment in it, the pace will be quickened and the level of achievement will be higher. Similarly, if the rate of educational growth is slowed down in any country, the education pyramid will be affected accordingly.

The level of enrolments that each country is likely to achieve by 1980 is to be assessed in the context of the position reached so far, the policies embodied in the national plans and other factors such as supply of teachers, materials, etc. On these considerations it is possible to combine the countries in the region in three groups with reference to the time in which they are likely to achieve at least seven years of universal compulsory education, namely: (A) those which are likely to achieve it after 1980; (B) those which are likely to achieve it around 1980; (C) those which are likely to achieve it before 1980.

Accordingly, the countries may be considered in the following groups: Group A: Afghanistan, Laos, Nepal; Group B: Burma, Cambodia, India, Indonesia, Iran, Mongolia, Pakistan, Republic of Viet-Nam; Group C: Ceylon, Republic of China, Republic of Korea, Malaysia, Philippines, Singapore, Thailand.

For descriptive purposes some educational, demographic, economic and social indicators relating to the countries are shown in Appendix D.

For assessing the orders of magnitude for the development of the education system at all levels viewed as integrated wholes, and the main directions of the educational tasks that lie ahead, the indicator adopted here (the size of the base pyramid) is of particular importance, because in the long run the dimensions of an educational system are determined by the size of the initial input. In spite of a wide range of variations within each group and indeed, in some cases, within each country, the grouping also discloses rhythms of educational development at three different stages, which are closely though not automatically or unalterably correlated with indicators of general socio-economic development such as *per capita* income, sectoral distribution of the labour force and mortality rates. This would also be operationally useful and help in focusing attention on the problem of educational growth characteristic of different stages of development, and thus provide to Member States a possible

frame of reference for developing their respective national plans.

School structure: presentation in a standardized form

The structure of school systems differs from country to country in Asia and, in some instances, even within a country from one part to another. The significance of the enrolment rates at any level of education in a country is derived from the length of schooling at that level provided by the school system. For presenting an analysis of the future educational developments in a group of countries or in the region as a whole, it is therefore essential to adopt a measure into which the flow of enrolments in differing school systems can be fitted to provide a common and comparable basis for interpreting the significance of these figures and their movement. This has been done in the form of a hypothetical school structure. It assumes the total period of school education as twelve years,¹ within which the first seven grades (which in a number of countries cover primary and a part of lower secondary education) have been taken as the first level of education for convenience of presentation and in accordance with the recommendation of the Karachi Plan for a minimum of seven years of compulsory education. The second level which will then comprise five years is divided into two parts, Grades VIII-X and Grades XI and XII. In this Model the third level of education follows twelve years of school education.

The hypothetical school structure does not only show the movement of enrolments in quantitative terms. It is intended also to exhibit the consequential qualitative changes that are called forth in the form of diversification of the second and third levels of education to provide for varying types of skills, to identify the major points of transition on which selection and allocation procedures will have important bearings, and the interrelationships of all levels and sectors of education. In this way the Model is designed to reflect future educational, social and economic needs as they emerge in the course of development. It is not, however, intended to serve as a 'model pattern'. The national systems, shaped by their particular needs and requirements, will necessarily vary. But it should be possible to determine, in terms of this system, the main dimensions of the problems that arise at different stages of educational development for each group of countries with their differing distributions between levels

and types of education, and the implications of any changes that may be envisaged.

The hypothetical school structure is therefore designed with the following purposes in view:

1. As a device for statistical presentation of future educational needs, and for preparing projections in a comparative setting. The figures and their significance have to be interpreted in terms of the structure that has been assumed.
2. It is a framework to show the interrelationship of different levels and types of education and how they may be affected by changes introduced at any point.

Figure 1 sets out the structure of the school system that has been assumed for the purposes outlined above. The basic unit of calculation is the individual grade or year of study and the data can be regrouped into any system of education, although in that case the points of transition will be different. The system is described below:

1. *First level of education.* This consists of the first seven grades, I to VII. The duration of compulsory education varies in the countries of the region from four years to eight or nine years. A large number of countries in the region have six years. The Karachi Plan set a target of a minimum of seven years of universal and compulsory education, which might be phased into two stages, five plus two.
2. *Second level of education.* It comprises five years of schooling marked out vertically in two stages, one including Grades VIII-X and the other Grades XI and XII. It is at the second level of education, following the period of compulsory education, that the need for diversification becomes marked, particularly in consideration of the requirements of the economy. Therefore, these two stages have been divided horizontally in order to provide respectively for pupils who will continue their education through the second level and may proceed to further education, and those who will terminate their schooling at this stage. The latter category of pupils may be enrolled in a large variety of courses, either essentially vocational and preparing directly for agricultural, industrial or commercial occupations, or diversified so that they include both general education and an introduction to practical subjects. These courses may take place in different

1. In accordance with the recommendations of the Tokyo Meeting of Education Ministers.

schools or in the same one. Therefore, it is only for the convenience of presentation that the two streams, general and vocational-terminal, have been shown separately. In addition, it is envisaged that a certain proportion of pupils qualifying from the vocational schools at the high-school stage may need to continue their vocational training at the higher-secondary level. Provision is made in the structure for the training of primary-school teachers, since in most of the countries in the region, during the period up to 1980, the supply of primary-school teachers will be drawn from training institutions at the higher-secondary level. Where a vocational course or teacher-training course is of three years' duration, the third year has been accounted for at the post-secondary stage, though structurally it will be the 'top' of the second-level institution.

3. *Third level of education.* Higher education, for purposes of presenting the assumed structure, has been divided into two main fields: scientific and technological (including medicine and agriculture) and arts (including social sciences and law). The duration will vary according to the specific fields of study and specialization. Similarly, studies at research level are part of the structure though not shown separately. The only details specifically marked out relate to the training of teachers from institutions other than universities, and the training of technicians for a level just below the technologist.

The structure of the school system outlined above is based on the following assumptions:

1. Diversified courses of education will be available after the first level to meet the emerging educational, economic and social needs and as a necessary consequence of expansion at the first level of education. Such diversification is not feasible unless an extensive base of enrolment at the first level is developed. This needs to be provided for in projecting the pace of educational development.
2. Education at the second level is conceived as a self-contained whole, and not merely as a preparatory stage for entrance to the university.
3. The division of the second level of education into two stages is needed in consideration of the levels of educational and general development that most countries of the region will reach by 1980.
4. Considering the pattern of manpower requirements in the region during the projected period, vocational

education needs to be provided at four levels in the educational system—skilled worker, junior technician, technician and engineer or technologist.¹ Vocational education, at the lowest level, will, however, tend to merge into the next higher level, as a country enters a higher level of economic development and the scope of general education is extended.

5. Provision is necessary for transfer of pupils from one type of education to another, particularly between vocational and general education streams and for further study from the vocational schools.
6. Selection and allocation procedures will be operative in guiding the flow of enrolment through the system.
7. Equal opportunities would be provided for girls in all types and levels of education in general and, particularly in technical and vocational education, facilities for girls and women would be the same in importance and range as those offered to men.

Methodology used in the Asian Model

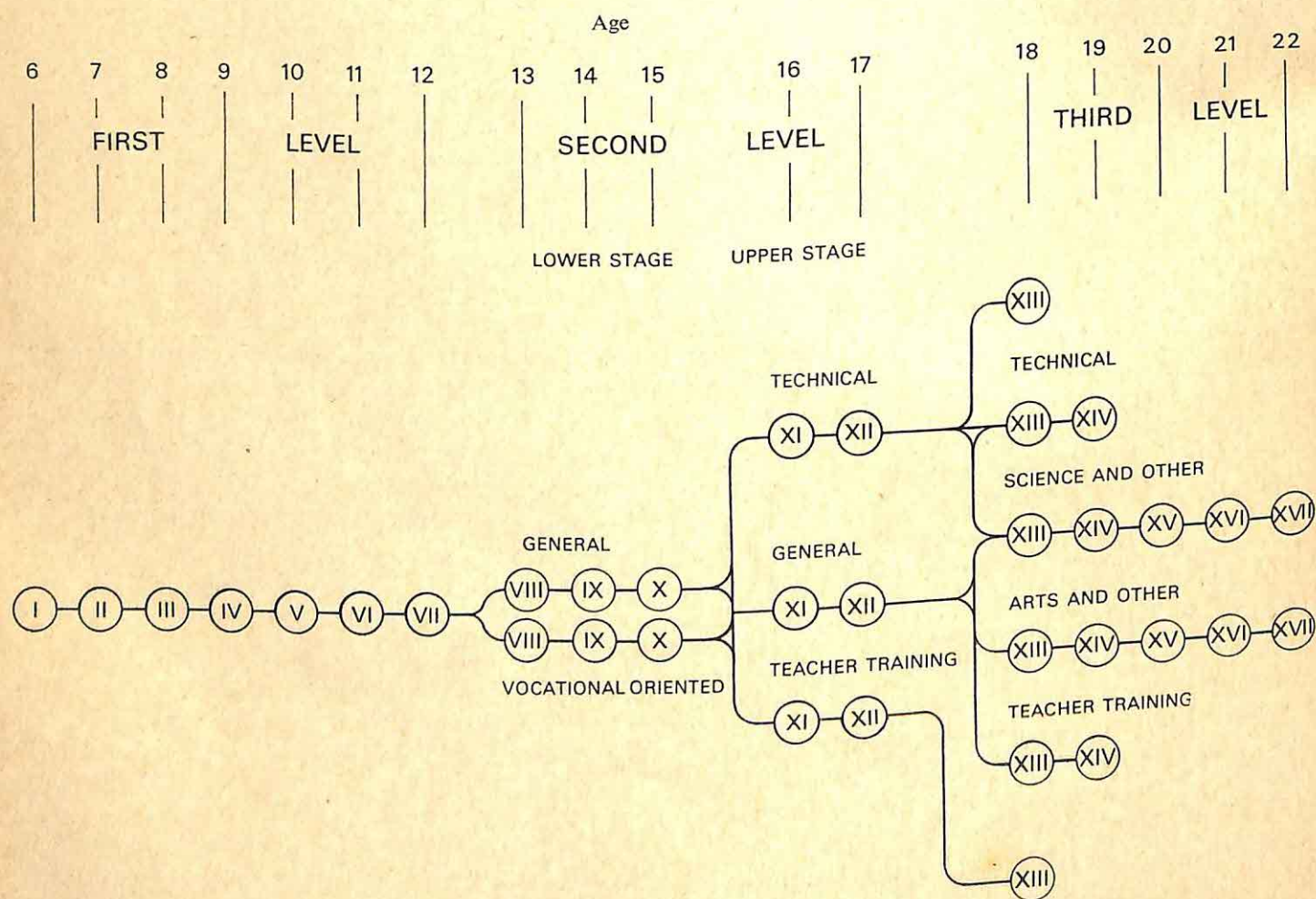
The concepts outlined in the previous section were designed to be sufficiently detailed to form the basis for a national methodology using nearly complete data and hypotheses. They are detailed in order to permit adaptation to particular situations and are not invalid if all of the elements noted are either not available or not relevant within the framework of educational planning as it may be practised in a particular country.

In the application to the Asian region it became apparent that all of the data and hypotheses that are identified in the concepts were not available or relevant for the region as such. The methodology actually used for the region was, therefore, adapted to suit the particular conditions prevailing. This methodology may be viewed as an example of one adaptation of the concepts to a particular situation which, in the Asian region as a whole, is characterized by the lack of some of the detailed information used in the concepts.²

Enrolment in the first grade of primary school was obtained by:

1. Recommendation concerning technical and vocational education, adopted by the General Conference of Unesco at its twelfth session, December 1962.
2. See Appendix G for a glossary of the symbols used for the methodology.

Figure 1. Hypothetical school structure.



(Formula 1)

$$E_y^{(g)} = e_y^{(g)} P_y^{(a)}.$$

Formula 1 replaced for Grade I enrolment formulae A-1, A-2 and A-3. In the absence of age-grade specific enrolment data the population aged 6 was used as an approximation of the relevant population size for first-time enrolment which was assumed to be the only entry point into the school system. The value for e allowed for repetition and newcomers since no detailed data were available and also allowed for some age divergence in the first grade from the six-year-old age-group, as was concluded from analysis of data for the base year. Since this was a regional model, net immigration into the school system was not taken into account. Since Formula 1 was used only for the first grade enrolment, no promotion from previous grades into Grade I was possible.

In order to calculate enrolment in all grades above the first, the following formula was used:

(Formula 2)

$$E_y^{(g)} = (1 - o_{y-1}^{(g-1)}) E_{y-1}^{(g-1)}$$

where: o = proportion of enrolment leaving the school system (output rate).

In the absence of detailed data on the repetition rate, promotion rate, wastage rate, successful school-leaving rate as well as for newcomers the output rate was used to describe the output from the school system between two subsequent grades in two subsequent years. The complete subsequent grades in two subsequent years. The progression rate between two ment $(1-o)$ is therefore the progression rate between two subsequent grades in two subsequent years, which implicitly assumes that the number of repeaters in any grade is equal (this assumes that the repetition rate increases from grade to grade for which there is some evidence). The output rate, of course, includes the effect of all factors resulting in students leaving the school system. No allowance was made for newcomers. The output of the system, in these terms was calculated by:

(Formula 3)

$$O_y^{(g)} = o_y^{(g)} E_y^{(g)}$$

where: O = number of students leaving the system (output).

Formulae 2 and 3 replaced formulae A-7 and A-8.

Enrolment of a given type in a grade was calculated by:

(Formula 4)

$$E_y^{(t, g)} = d_y^{(t, g)} E_y^{(g)}.$$

Age-grade specific data were not available for the Asian Model and therefore formula 4 replaced formula A-6, of which it is a simplified version. Formula 4 was used to calculate enrolment of all types in each grade and the total of all types for each grade thus replaced formula A-5 as well. Furthermore, formula 4 was only used to calculate enrolment in the beginning grade of each type of education. For all of the successive grades in each type, formula 2 was used separately with the exception of teacher training. The number of teachers needed for teaching was calculated by:

(Formula 5)

$$T_y^{(t, g)} = \frac{E_y^{(t, g)}}{f_y^{(t, g)}}.$$

It will be noted that formula 5 is identical to formula B-1.

The number of additional teachers required for teaching in a type and grade was calculated by:

(Formula 6)

$$R_y^{(t, g)} = \frac{E_y^{(t, g)}}{f_y^{(t, g)}} - \frac{(1 - z_{y-1}^{(t, g)}) E_{y-1}^{(t, g)}}{f_{y-1}^{(t, g)}}$$

where: z = proportion of teachers leaving the school system for all reasons.

In the absence of specific data regarding transfer of teachers between types of education, retirement of teachers and teachers leaving the school system for other reasons, the expression z was used to summarize the net effect of all of these factors, including the death-rate. It is, therefore, a simplified version of formula B-3.

The number of additional teachers required for teaching a given type and grade with a particular qualification was calculated by:

(Formula 7)

$$R_y^{(t, g, i)} = \hat{d}_y^{(i)} R_y^{(t, g)}.$$

Formula 7 was used separately for each teacher qualification and the sum of all of them for each type and grade—thus replacing formula B-4.

The calculation of enrolment in the terminal grade of a particular type of teacher-training institution was based upon the assumption that enrolment in the terminal grade should be equal to the requirement for additional teachers having the qualification given by that particular type of teacher-training institution. Formula 7, therefore, which determined the number of additional teachers needed, was also used to determine the enrolment in the terminal grade of the relevant teacher-training course. Thus, the following expression was used:

(Formula 8)

$$E_y^{(TTR, \hat{\theta})} = R_{y+1}^{(TTR, \hat{\theta})}.$$

Formula 8 replaced formula C-1 in the computations since detailed data regarding the proportion of additional teachers not coming from teacher-training institutions, by qualification, and the proportion of graduates not entering the profession, by qualification, was not available for the region. The assumption was implicit, therefore, that these two factors, which influence the magnitude of the required enrolment in teacher-training institutions in opposite directions, result in zero. Furthermore, in the absence of data on the proportion of those who graduate to those who enter the terminal grade of teacher-training institutions, and based upon some evidence for the region that students who reach the terminal grade of teacher-training institutions are, in fact, considered as qualified for teaching in the following year, enrolment in the terminal grade was considered to be identical with those successfully completing the terminal grade.

In order to calculate enrolment in grades preceding the terminal grade of teacher training of a particular type the following formula was used:

(Formula 9)

$$E_y^{(TTR, \hat{\theta}-1)} = \frac{E_{y+1}^{(TTR, \hat{\theta})}}{1 - O_y^{(TTR, \hat{\theta}-1)}}.$$

Formula 9 was used in place of formula C-2 under the same conditions as those in which formulae 2 and 3 replaced formulae A-7 and A-8.¹

For the calculation of per-pupil recurring costs the following formula was used:

(Formula 10)

$$v_y^{(t, g)} = \frac{F_y^{(t, g)}}{f_y^{(t, g)} K_y^{(t, g)}} + \hat{v}e_y^{(t, g)} \mu_y^{(t, g)} + \hat{v}h_y^{(t, g)} \hat{v}_y^{(t, g)}$$

where: K = proportion of average teacher salary to all recurring costs excluding books, welfare, auxiliary, stipend and central administration.

Information was available in the region concerning average teacher salaries as well as concerning the proportion of teachers' salaries to all recurring costs excluding books, welfare, auxiliary, stipend and central administration. Thus, per-pupil recurring costs for teacher salaries alone and for non-teaching personnel, general administration, maintenance and operation and instructional materials other than books—combined—was obtained. In other words the expression

$$\frac{F_y^{(t, g)}}{f_y^{(t, g)} K_y^{(t, g)}}$$

used in formula 10 is equal to $\hat{v}a + \hat{v}b + \hat{v}c + \hat{v}d + \hat{v}i$ in formula E-1. Information was also available concerning the per-pupil cost of books for pupils receiving books and the proportion of pupils receiving books, which was assumed to vary over time and so instead of using expression $\hat{v}e$ as in formula E-1 the expression for book costs used in formula 10 was identical to formula E-3. The per-pupil cost of stipends was applied to enrolment in some types of teacher-training institutions and the expression used in formula 10 was identical to formula E-6.

Total recurring costs, by type and grade, were obtained by:

1. An example illustrating the calculation of a type of teacher-training enrolment for the three-year teacher-training course (Grades XI, XII and XIII) for teachers for the primary schools (Grades I-VII) as used in the Asian Model where this type of qualification was used for a proportion of teachers needed in primary schools is:

$$E_y^{(TTR, XIII)} = d_{y+1}^{(TTR, XIII)} R_{y+1}^{(primary, I-VII)}$$

$$E_y^{(TTR, XII)} = \frac{E_{y+1}^{(TTR, XIII)}}{1 - O_y^{(TTR, XII)}}$$

$$E_y^{(TTR, XI)} = \frac{E_{y+1}^{(TTR, XII)}}{1 - O_y^{(TTR, XI)}}$$

(Formula 11)

$$V_y^{(t, g)} = v_y^{(t, g)} E_y^{(t, g)}$$

which is identical to formula E-7. It should be noted, however, that these costs exclude welfare, auxiliary and the central administration costs not attributable by level and type. The central administration costs which were not attributable by level and type were assumed as a fixed proportion to total recurring costs (excluding stipends). Thus total recurring cost for all types and grades combined was expressed by:

(Formula 12)

$$V_y = v_y E_y + L_y (v_y E_y - \widehat{v} h_y E_y)$$

where: L = percentage of central administration costs to all other recurring costs excluding welfare, auxiliary and stipend costs.

The calculation of unit capital costs for schools was obtained by:

(Formula 13)

$$u_y^{(t, g)} = \widehat{u} a_y^{(t, g)} + c_y^{(t, g)} q_y^{(t, g)} + \widehat{u} k_y^{(t, g)}$$

where: $\widehat{u} a$ = cost per pupil-place for site for schools
 c = cost per unit area (square metres) for building schools

q = per-pupil-place area requirements (square metres) for building schools

$\widehat{u} k$ = cost per pupil-place for furniture and equipment, etc., for schools.

It can be seen that formula 12 is essentially identical to formula E-8. The information for the region was not available in the same detailed form as that identified in formula E-8 and thus $\widehat{u} a$ in formula 12 was substituted for $\widehat{c} a$ times $\widehat{q} a$ in formula E-8. Similarly c was equal to $\widehat{c} b + \widehat{c} c + \widehat{c} d + \widehat{c} e$ in formula E-8 and q was equal to $\widehat{q} b + \widehat{q} c + \widehat{q} d + \widehat{q} e$ and $\widehat{u} k$ was equal to $\widehat{u} b + \widehat{u} c + \widehat{u} d + \widehat{u} e$.

The calculation of unit capital costs for student residences was obtained by:

(Formula 14)

$$\dot{u}_y^{(t, g)} = \dot{u} \dot{a}_y^{(t, g)} + \dot{c}_y^{(t, g)} \dot{q}_y^{(t, g)} + \dot{u} \dot{k}_y^{(t, g)}$$

where: $\dot{u} a$ = cost per resident-place for site for student residences

\dot{c} = cost per unit area (square metres) for building student residences

\dot{q} = per-resident-place area requirements (square metres) for building student residences

$\dot{u} k$ = cost per resident-place for furniture and equipment, etc., for student residences.

As in the preceding case $\widehat{u} a$ in formula 11 was equal to $\widehat{c} f$ times $\widehat{g} f$ in formula E-9 while \dot{c} was equal to $\widehat{c} g + \widehat{c} h$ and \dot{q} was equal to $\widehat{q} g + \widehat{q} h$ and $\dot{u} k$ was equal to $\widehat{u} g + \widehat{u} h$.

Total capital costs were computed by:

(Formula 15)

$$U_y^{(t, g)} = u_y^{(t, g)} [E_{y+1}^{(t, g)} - (1 - x_y^{(t, g)}) E_y^{(t, g)}] + \dot{u}_y^{(t, g)} \pi_y^{(t, g)} E_y^{(t, g)}$$

It will be noted that formula 15 incorporates elements of formulae E-6, E-12 and E-13. In the Asian Model it was assumed that all pupil-places and resident-places for students would take one year to complete and therefore the use of formulae E-15 and E-16 were not necessary. Furthermore, utilization of all pupil-places was assumed to be on a full one-shift basis and therefore the use of formula E-12 was also unnecessary. No provision for residences for teachers was made in the Asian Model and so formulae E-14 was not used.

Since precise information regarding existing residences for students was lacking, the number of residences for students was calculated on the basis of provision for a proportion of total enrolment in certain types of education rather than on additional enrolment and replacement of existing resident-places.

Finally, total costs were computed by:

(Formula 16)

$$W_y^{(t, g)} = V_y^{(t, g)} + U_y^{(t, g)}$$

which is identical to formula E-18. The total value for recurring costs for all types and grades (V) was obtained by using formula 12 while the total value for capital costs for all types and grades was obtained by summing $U^{(t, g)}$ as shown in formula 16 for all types and grades.

Required values for methodology

For base year, all relevant types and grades: E ;
 for all relevant years: L ;

for all relevant years, age 6 only: P ;
for all relevant years, grade I only: e ;
for all relevant years, types and grades:

$F; K; c; \dot{c}; d; \dot{d}; f; o; q; \dot{q}; \hat{u}a; \hat{u}a; \hat{u}k; \hat{u}k;$
 $\hat{v}e; \hat{v}h; x; z; \mu; \pi; \dot{v}.$

Projections of educational development

Estimates of the future development of education in the region given in the following pages are not mere statistical projections of past trends. Their main function is to present within the assumptions made an internally consistent picture based on certain aims and objectives, and the desirable targets for future levels of educational development if these objectives of over-all development are to be achieved.

The projections for 1980 and the intervening years have been built up by following single age-grade cohorts through the system. The Model thus shows the targets for each year of the period 1964-80. For convenience of presentation, they are shown in the tables for the years 1964, 1970, 1975 and 1980. By modifying the assumptions to suit the structural pattern in a national system it will be possible to interpret the projections presented by means of this hypothetical Model in terms of any national system and to see the consequences of variation of 'input' at any point. The 1980 targets are presented for the whole region and also for each group separately. The latter may serve as illustration of different combinations into which the elements of the Model may be viewed to accord with varying paces of development.

In the projections, the age of entry in the first grade is taken as 6. In the developing countries of the region, enrolments in the beginning grades do not always correspond to specific ages but cover also a proportion of children from lower or higher ages. It is obviously desirable on educational grounds that this correspondence should be established, but during the transition period, when primary education is being expanded, some divergence may be unavoidable. On the other hand, even when compulsory education is fully enforced, the enrolment is not 100 per cent and there is a small shortfall because of illness and other causes. According to the projections, countries in Group C would achieve full enrolment at the first level by 1980, but since in most of the countries in the group the correspondence between grade and age specifics would have not been established, the enrolment would continue to include a proportion of children from lower

or higher ages. Consequently the total enrolment would exceed the population of the specific age-group 6-12 years.

The rate of population growth has a major effect on the projections. The methodology used in preparing demographic projections is explained in Appendix A, but it may be noted that in view of the time period considered, any change in the growth rate would have important consequences on the enrolment figures shown in the projections.

Projections for countries in Group A (Table 19)

The population of the countries in Group A represented 3 per cent of the regional total in 1964 and will also be 3 per cent in 1980. They have at present low enrolment ratios at all levels of education: only 18 per cent for the first level, 2 per cent for second-level education and less than 0.5 per cent at the third level.

The level of teachers' qualifications is below the regional average, and substantial proportions of them have less than ten years of basic schooling. Pupil-teacher ratios are very low at the second level because of the inadequate development of this level.

Institutions at the third level are being newly developed, but do not as yet account for a significant output of graduates.

The 1980 projections for Group A comprise the following targets and assumptions:

1. At the first level an essential objective is to expand education facilities. By 1980, enrolment in Grades I-V would reach 53 per cent of the corresponding age-group, and 45 per cent in Grades I-VII. The rate of drop-outs will need to be considerably reduced.
2. The second level is of critical importance for the supply of teachers for primary schools and the middle-level personnel required for social and economic development. By 1980, the pupils completing Grade VII would still be a selective group and therefore the transition or progression rate from Grade VII to Grade VIII (first grade of second level) is assumed to be 83 per cent.
3. Vocational education at the lower stage (Grades VIII-X) will need special attention in view of the limited existing stock and the demands likely to emerge from the economic sectors, particularly agriculture.
4. At the upper stage of the second level (Grades XI and XII) 80 per cent of those passing from the general stream of lower stage of second-level Grade X would proceed to the upper stage of the second level, Grade XI.

5. Technical and vocational education at the upper stage of the second level would be developed so that it would constitute one-third of all enrolment at that stage.
6. At the third level, 70 per cent of the pupils passing from Grade XII of the general stream and 20 per cent from technical and vocational streams would go into higher institutions. The distribution by branches of study would be 51 per cent in science, science-based, technological and technical education and 49 per cent in arts, humanities, social sciences and education.
7. For teachers for the first level, the minimum essential qualification would be raised to ten years of basic schooling and two years of professional training which would account for 60 per cent of primary teachers entering the profession by 1980. The other 40 per cent would have three or more years of professional training.
8. Education of adults and out-of-school youth will be of great significance for general development as well as educational expansion. The education system will not have developed sufficiently to ensure literacy for all young people and therefore literacy programmes will have to supplement the formal education system, if the rate of illiteracy is to be reduced.

Achieving the above targets by 1980 would call for the following average annual rates of increase in enrolment: first level, 8.2 per cent; second level, 14.1 per cent; third level, 14.3 per cent.

Projections for countries in Group B (Table 19)

The population of these countries is about 84 per cent of the total population of the region, and in 1980 it will be 82 per cent.

The enrolment ratio for the first level is about 57 per cent. The second level is sufficiently developed to sustain growth at the first and the third levels. The enrolment distribution in the three levels of education is 86.8 per cent, 11.7 per cent and 1.5 per cent.

The incidence of drop-outs at the first level is very heavy. It is estimated that of 100 children who enter Grade I, only 34 reach Grade V and 28 Grade VI or VII. Girls constitute only 34 per cent of the enrolment at this level.

Because of the selective character imposed by heavy drop-outs on cohorts reaching the terminal grade of primary schooling, the transition rate to the second level is high—about 86 per cent of primary-school leavers proceed to the second level.

Technical education is not well developed, either at the second or third levels, to meet the needs of the economy.

The ratio of technicians to technologists is most unfavourable. Agricultural education is particularly inadequate. For lack of diversification in the education system, there are surpluses in the output from some forms of education and critical shortages in certain others.

The output of teacher-training institutions during the last decade has not been enough to meet the rapidly expanding requirements of the first level of education and the teaching force includes a substantial proportion of unqualified and untrained teachers. A small but slowly growing percentage of teachers for the first level is now being drawn from teacher-training institutions at the third level.

Higher education is well established but carries a heavy emphasis on arts and humanities and provision for science and science-based studies, though growing is far from adequate. A beginning is being made to develop specialized non-university institutions (for example, polytechnics, etc.).

The 1980 projections for this group comprise the following targets and assumptions:

1. At the first level compulsory education would be achieved—some of the countries reaching the target a year or two before 1980 and others between 1980 and 1985. Drop-out rates would have to be considerably reduced. With the universal provision of at least seven years of education for all children, the proportion of those who will continue their education at the second level will be somewhat less than at present. For meeting the needs at the second and third levels, it is estimated that 81 per cent of the primary-school leavers would proceed to the second level.
2. At the lower stage of the second level (Grades VIII–X) of all the primary-school leavers who enter, 30 per cent would be prepared in courses of terminal character including courses which are vocational biased as well as those which are specifically vocational and practical in intent.
3. The upper stage of the second level (Grades XI and XII) would receive 70 per cent of the pupils from Grade X of the general stream and 10 per cent from those who would have taken vocationally oriented courses at the lower stage. There would be greater diversification, with provision for specialized technical and vocational education. The distribution of enrolment envisages 58 per cent in general academic, 39 per cent in technical-vocational and 3 per cent in teacher training (including the teacher-training continuation course, Grade XIII).
4. At the third level, 55 per cent of the pupils passing from Grade XII of the general stream and 25 per cent

from the technical and vocational streams would go to the third level. The distribution by branch of study would be 54 per cent in science, science-based, technological and technical education and 46 per cent in arts, humanities, social sciences and education.

5. For teachers for the first level, the minimum essential qualification would be raised to ten years of basic schooling and three years of professional training. This would be the main source of supply, but would be supplemented by teachers trained in higher level institutions.
6. Adult education and education of out-of-school youth would be an important element in the strategy of educational development. The education system would be producing an increasing number of young people equipped with elementary education for whom opportunities for further education would be needed. These countries also have the largest number of adult illiterates and programmes of adult literacy and education would be vitally important.

Achieving the above targets by 1980 would call for the following average annual rates of increase in enrolment: first level, 5.2 per cent; second level, 8.4 per cent; third level, 7.3 per cent.

Projections for countries in Group C (Table 19)

The population of these countries accounts for about 14 per cent of the total population of the region. The proportion is estimated to reach 15 per cent by 1980.

At the first level, high enrolment ratio has been achieved (89 per cent in the first seven grades). A number of countries in the group are in the process of extending the duration of compulsory education to seven years or more.

The over-all enrolment distribution in the three levels of education is 85 per cent, 13 per cent and 2 per cent.

At the second level also the enrolment ratio is high, being 25 per cent for Grades VIII-XII. Technical and vocational education is gradually shifting from the lower stage to the higher stage of second level, with consequent prolongation of the period of general education.

Teacher training is being upgraded and an increasingly larger percentage of teachers for the first level are being trained in institutions at the third level.

Higher education is well established, but specialized non-university institutions are not developed to the extent commensurate with the need for technicians. The shift to science and science-based studies has yet to take place.

The 1980 projections for this group comprise the following targets and assumptions:

1. At the first level, universal compulsory education of at

least seven years' duration would be achieved in 1977 and the drop-outs would be considerably reduced. Of those who complete the first level 74 per cent would go on to the second level.

2. At the lower stage of the second level, 25 per cent of the pupils would be in courses of a vocational character, including courses which are vocational biased.
3. At the upper stage of the second level, 65 per cent of those who successfully complete the lower stage in the general academic stream and 10 per cent from the vocational courses would enter Grade XI. Of the total enrolment at this stage, 39 per cent would be in technical and vocational education, 59 per cent in the general academic course, and about 2 per cent in teacher training (including the teacher-training continuation course, Grade XIII). Technical and vocational education would be concentrated mainly at the upper stage of the second level and at the third level.
4. At the third level, 50 per cent of those completing Grade XII in general academic studies and 30 per cent from technical and vocational streams would enter the third level. The distribution by branch of study would be 56 per cent in science, science-based technological and technical education, and 44 per cent in arts, humanities, social science and education.
5. Teachers for the first level would be prepared mainly with twelve years of schooling and two years of professional training (or its variant of ten plus four). In some countries in the group, however, a small but diminishing proportion would continue to be prepared with ten years of schooling and three years of professional training. An increasing number would be prepared by universities and comparable institutions.
6. Adult education. Illiteracy rate is relatively lower in these countries and is declining rapidly. The main task would lie in the direction of providing widespread opportunities to the working force for further education and up-grading of skills.

Achieving the above targets would call for the following average annual rates of increase in enrolment: first level, 3.7 per cent; second level, 6.7 per cent; third level, 4.6 per cent.

Projection of educational development for the Asian region (Table 19)

The population of the region is estimated to increase from 913.3 million in 1964 to 1,370.2 million in 1980, and the school-age population (6-21) from 330.1 million (36 per cent of the total population) to 513.7 million (about 38 per cent of the total population) (Table 18). Changes in the

age composition of the population between 1964 and 1980 are likely to be as follows: age-group 6-12 which represented 18.7 per cent of the total population in 1964 would comprise 18.2 per cent in 1980; age-group 13-15 which was 6.5 per cent would be 6.9 per cent; age-group 16-17 from 3.9 per cent to 4.4 per cent; and age-group 18-21 from 7 per cent to 8 per cent.

The main targets for the region are:

1. The enrolment ratios in the three levels of education which in 1964 were 61:15:3.0 would change by 1980 to 90:33:5.0.
2. At the first level total enrolment (Grades I-VII) would increase from 103.8 million in 1964 to 225.2 million by 1980, or at an average annual rate of 5.0 per cent.
3. Enrolment at the second level (Grades VIII-XII) would increase from 14.4 million in 1964 to 50.3 million in 1980, or an average annual rate of 8.1 per cent. The enrolment ratio would reach 32.6 per cent by 1980 as compared with 15.1 per cent in 1964.

Education at the second level would be diversified and facilities for technical and vocational education at both stages would be expanded so as to increase from 19 per cent of the total enrolment at the second level in 1964 to 30 per cent in 1980.

4. At the third level, enrolment would increase from 1.9 million in 1964 to 5.5 million in 1980; an average annual rate of 6.7 per cent.

Besides strengthening university institutions, non-university institutions at the third level would be developed. In 1980, of the total enrolment at that level, enrolment in teacher-training and technical institutions (Grades XIII-XIV) would constitute 16 per cent compared with only 6 per cent in 1964.

Of the total enrolment at the third level, 55 per cent would be in science, science-based, technological and technical education, and 45 per cent in arts, humanities, social sciences and education.

5. In terms of the distribution of total enrolment by levels and types of education, the 'educational pyramid' in Asian region would evolve as shown in Table 17.

Teacher requirements¹ (Tables 20-22)

The number of additional teachers required is determined on the basis of the increase in enrolment and the replacement of those who die or leave the profession.

It is assumed that the pupil-teacher ratio would be increased during the period, and simultaneously the level of teacher qualifications would also be raised. The replacement rate, it is assumed, would go down gradually as a result of improvements in the conditions of service and qualifications of the teaching profession.

The teaching force at the first level, which is the largest education sector, would increase by 83 per cent over the period 1964-80 and the average annual output of teachers from training institutions over the sixteen-year period would be 437,000.

It is envisaged that by 1980, the minimum qualification for a teacher would be at least ten years of basic schooling plus two years of professional training. In 1980, in the region as a whole, teachers for the first level would be prepared with the following qualifications:

Basic schooling + professional training	Percentage
7+3	—
10+2	2
10+3	48
10+4	37
12+4	13
(or university degree)	—
	100

1. In the estimates of teacher requirements are included the requirements for supervisors/inspecting personnel.

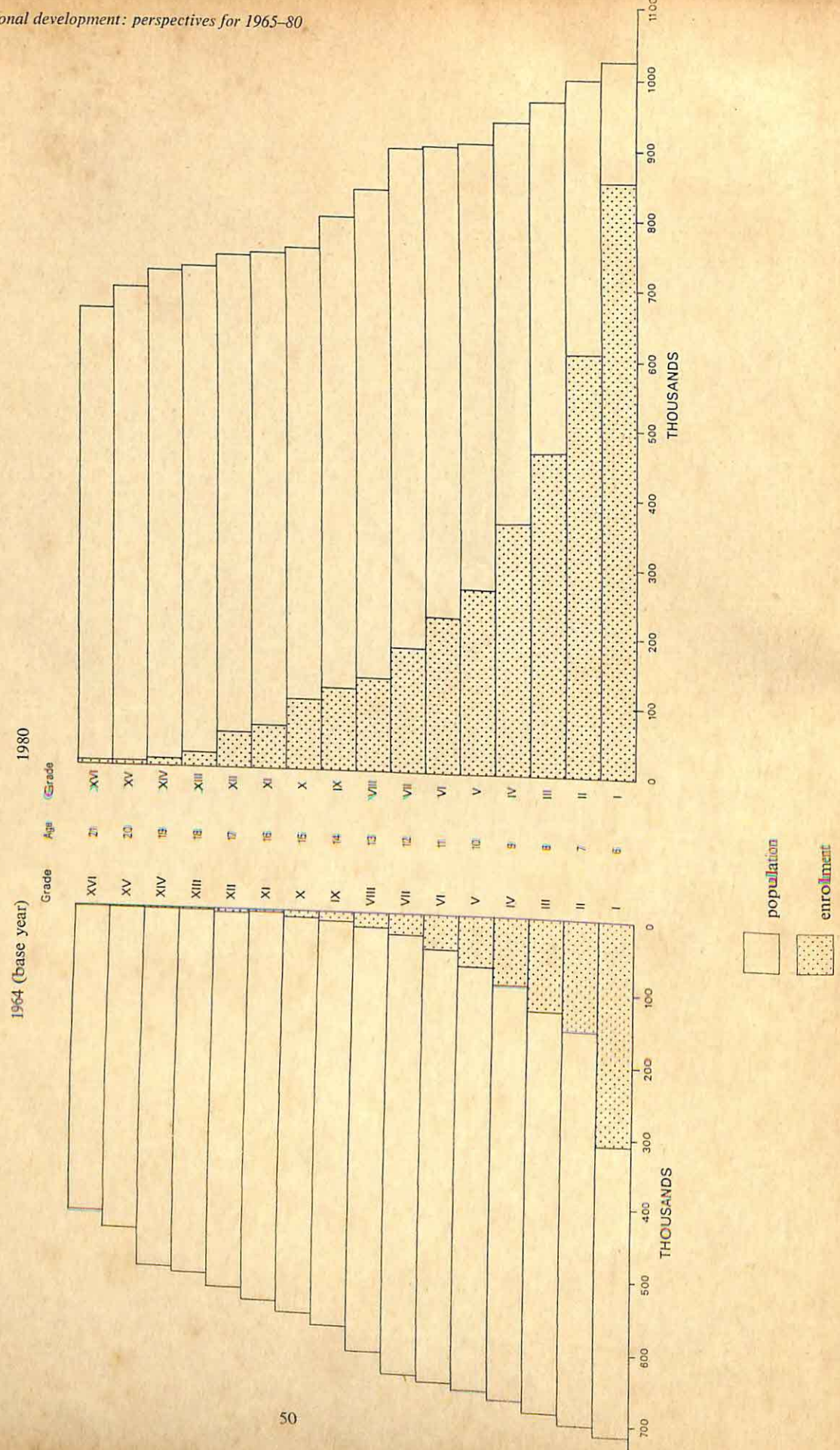
TABLE 17. Educational pyramid—distribution of enrolment by level and type, 1964, 1970, 1975 and 1980 (percentage)

	1964	1970	1975	1980
First level (I-VII)	86	84	82	80
Second level (VIII-XII)	12	14	16	18
Third level (XIII+)	2	2	2	2
	100	100	100	100
Second level (VIII-XII)				
Lower stage (VIII-X)				
General	84	78	72	72
Vocational	16	22	28	28
	100	100	100	100
Upper stage (XI-XII)				
General	55	56	56	58
Technical and vocational	30	33	38	39
Teacher training ¹	15	11	6	3
	100	100	100	100
Third level (XIII+)				
Teacher training (XIII-XIV)	4	6	4	3
Technical course (XIII-XIV)	2	5	9	13
Science, science-based and technological (XIII+)	39	40	42	42
Arts, humanities, social sciences, etc. (XIII+)	55	49	45	42
	100	100	100	100

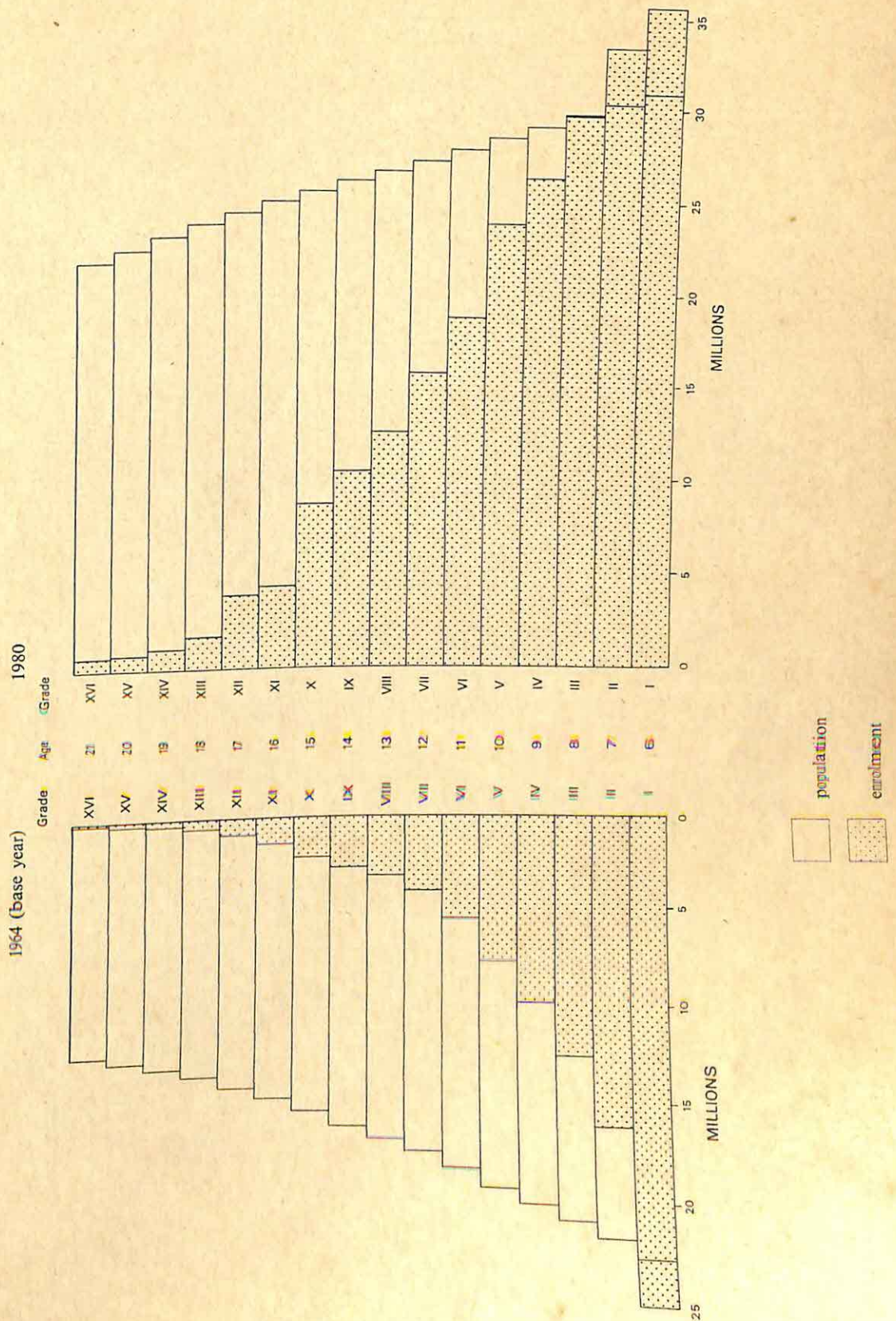
1. Includes teacher-training continuation course (Grade XIII).

Figure 2. Enrolment-population pyramid. Enrolment by grade and population by single year of age, 1964 and 1980.

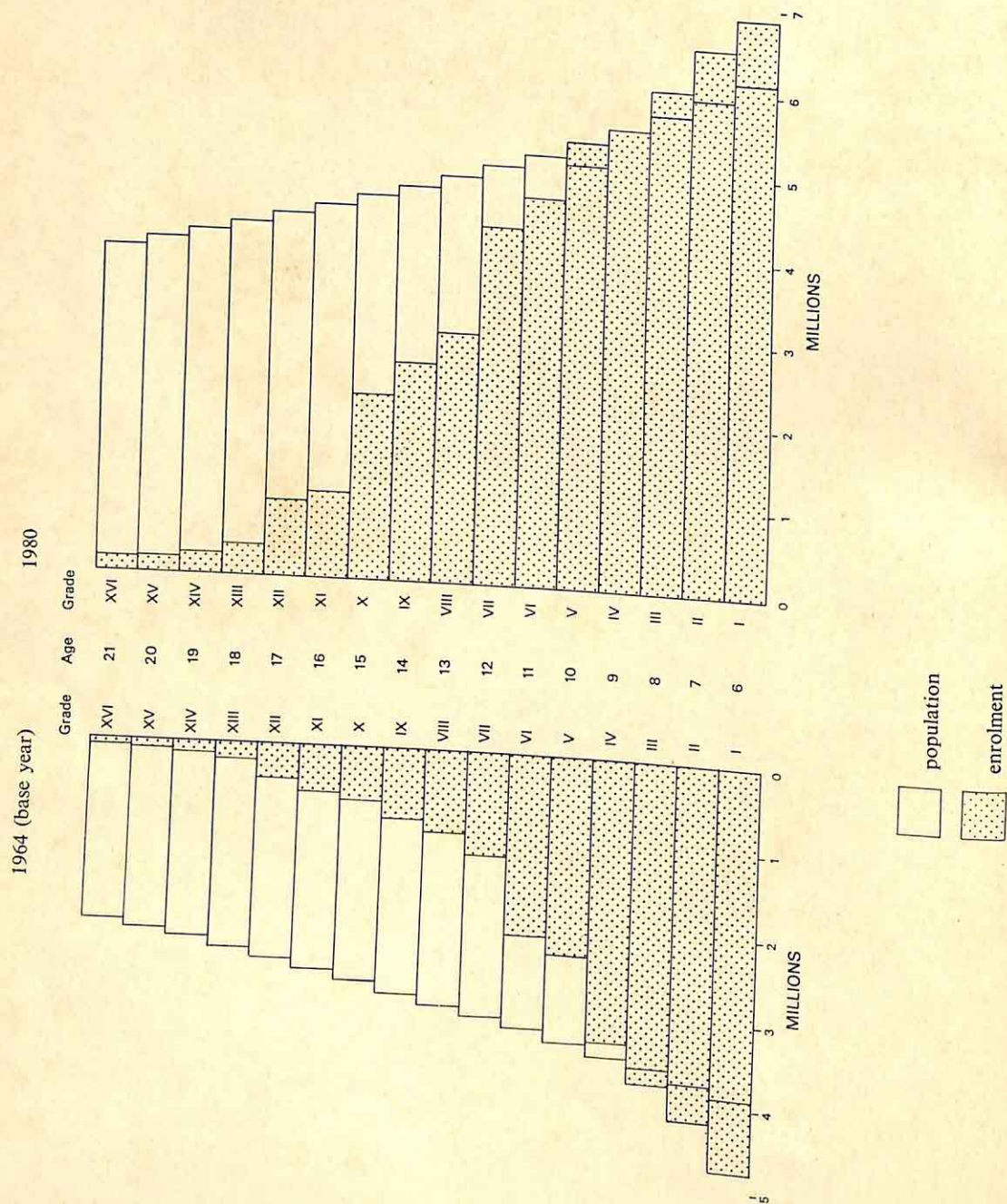
Group A



Group B



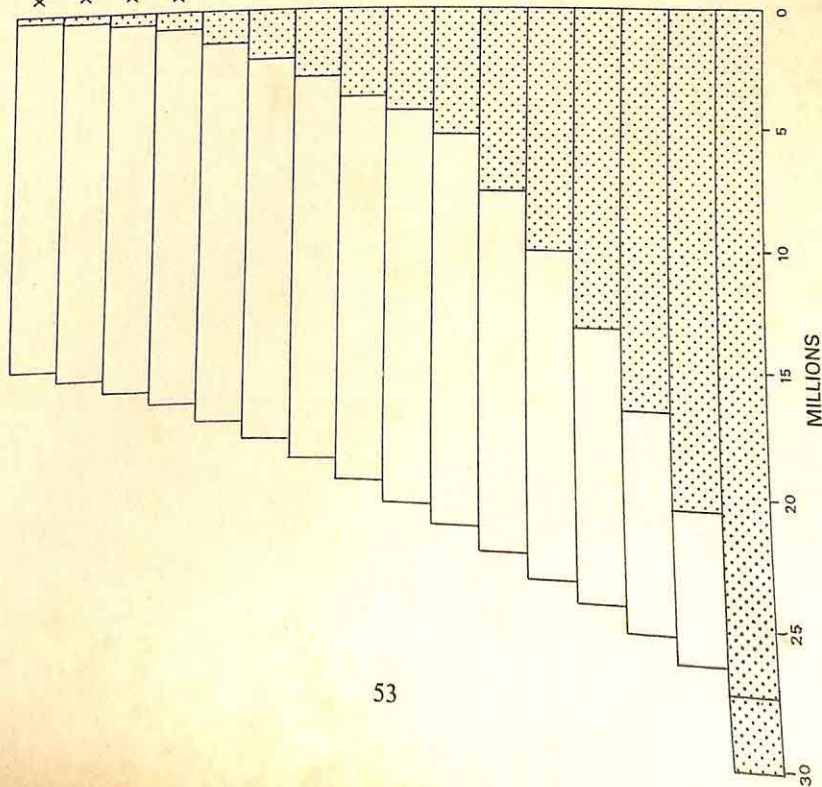
Group C



The region

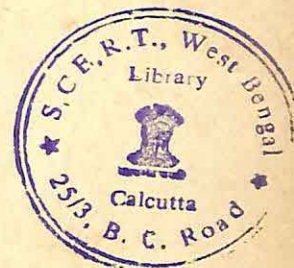
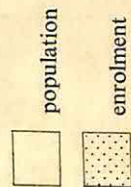
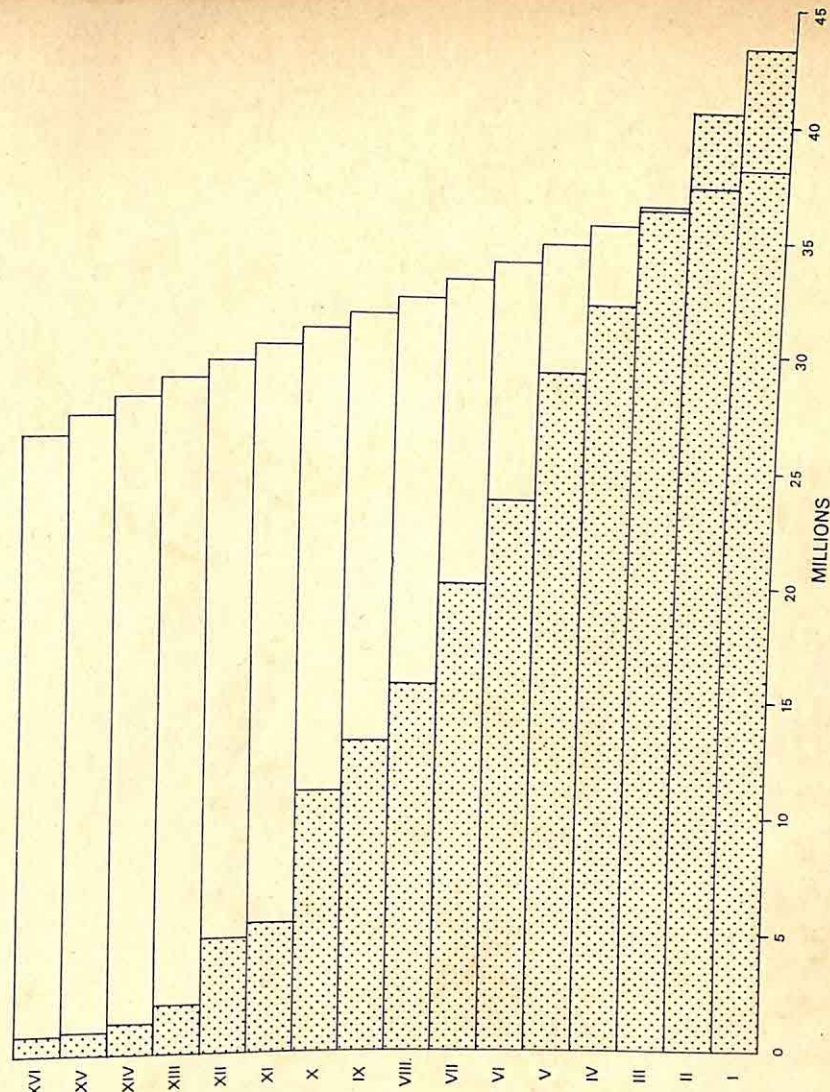
1964 (base year)

Grade Age



1980

Grade Age



At the second level the teaching force would increase by 195 per cent. It has been assumed that teachers for schools at the second level would be drawn from universities and university institutions for training teachers. Special measures for the preparation of teachers for technical and vocational education at the second level would be necessary as the increase in absolute numbers would be particularly high in this sector.

At the third level, the number of teaching staff in service by 1980 would increase by 200 per cent over the period.

Taking together all the levels and types of education, the teaching force would increase by 107 per cent over the period. The distribution by level of education where teachers will be in service will be 69 per cent at the first level; 26 per cent at the second level and 5 per cent at the third level, compared with 79 per cent, 18 per cent and 3 per cent respectively in 1964. In the projections, due to the increase in teacher qualifications, there is a decrease in the number of teachers coming from the second-level teacher-training institutions after 1970, as well as teacher training Grades XIII-XIV after 1975, while conversely the number coming from universities steadily increases. This is reflected in enrolments projected for 'Science and other' and 'Arts and other'.

In-service training of teachers

It was assumed that in-service training of teachers be provided for all teachers at the first and second levels of education so that all teachers would attend in-service training courses every five years. Such courses would take place at the second-level teacher-training institutions for first-level teachers and at higher-education institutions for second-level teachers. Since vacation courses would

be held during school holidays they would not affect normal teaching duties or require additional training staff.

TABLE 18. Estimated school-age population and total population, 1964, 1970, 1975 and 1980 (in thousands)¹

Age-group	1964	1970	1975	1980
<i>Group A</i>				
6-12	4 729	5 197	5 777	6 640
13-17	2 812	3 134	3 394	3 871
18-21	1 891	2 279	2 512	2 789
TOTAL 6-21	9 432	10 610	11 683	13 300
All ages	25 600	28 464	31 563	35 874
<i>Group B</i>				
6-12	141 869	166 801	185 650	203 830
13-17	78 900	98 556	113 500	127 617
18-21	52 816	65 689	78 947	90 918
TOTAL 6-21	273 585	331 046	378 097	422 365
All ages	762 500	885 487	1 003 572	1 127 312
<i>Group C</i>				
6-12	24 462	29 489	33 753	38 820
13-17	13 704	17 169	20 011	22 950
18-21	8 958	11 470	13 918	16 237
TOTAL 6-21	47 124	58 128	67 682	78 007
All ages	125 200	150 448	176 021	207 012
<i>The region</i>				
6-12	171 060	201 487	225 180	249 290
13-17	95 416	118 859	136 905	154 438
18-21	63 665	79 438	95 377	109 944
TOTAL 6-21	330 141	399 784	457 462	513 672
All ages	913 300	1 064 399	1 211 156	1 370 198

1. Data based on estimates of the population 6-21 years of age by single years which have been derived by applying Sprague multipliers to the national data distributed by five-year groups of age. For sources of the population projections used as basis for the estimates, see Appendix A.

TABLE 19. Estimated enrolment at all levels, 1964 (base year), 1970, 1975 and 1980 (in thousands)

Level of education	1964	1970	1975	1980
GROUP A				
FIRST LEVEL (I-VII)				
Grades I-V	755	1 196	1 780	2 561
Enrolment ratio	22.00%	31.62%	41.99%	52.93%
Grades I-VII	835	1 360	2 039	2 966
Enrolment ratio	17.67%	26.16%	35.29%	44.67%
Proportion of all levels	93.1%	89.5%	87.0%	85.2%
SECOND LEVEL (VIII-XII)				
Lower stage (VIII-X)				
General	37	97	174	286
Vocational	10	26	44	68
Total (VIII-X)	47	123	218	354
Upper stage (XI-XII)				
General	6	16	33	60
Technical and vocational	1	5	17	38
Teacher training ¹	3	7	10	16
Total (XI-XII)	10	28	60	114
Total (VIII-XII)	57	151	278	468
Enrolment ratio	2.00%	4.79%	8.16%	12.04%
Proportion of all levels	6.3%	9.9%	11.9%	13.4%
THIRD LEVEL (XIII+)				
Teacher training (XIII-XIV)	0.4	0.7	1.3	2.7
Technical course (XIII-XIV)	0.1	0.7	4.0	9.1
Science and other (XIII+) ²	1.9	3.0	10.0	15.2
Arts and other (XIII+) ³	3.2	4.6	11.5	20.5
Total (XIII+)	5.6	9.2	26.8	47.5
Enrolment ratio	0.30%	0.43%	1.10%	1.77%
Proportion of all levels	0.6%	0.6%	1.1%	1.4%
TOTAL (ALL LEVELS)	897	1 520	2 344	3 481
IN-SERVICE TRAINING				
First-level teachers	—	5.7	8.3	10.3
Second-level teachers	—	1.2	2.0	2.9
Total	—	6.9	10.3	13.2

TABLE 19 (cont.)

Level of education	1964	1970	1975	1980
GROUP B				
FIRST LEVEL (I-VII)				
Grades I-V	71 618	97 635	121 310	148 849
Enrolment ratio	67.96%	79.26%	89.02%	100.05%
Grades I-VII	81 204	112 918	144 355	183 286
Enrolment ratio	57.24%	67.70%	77.76%	89.92%
Proportion of all levels	86.8%	84.6%	82.7%	80.5%
SECOND LEVEL (VIII-XII)				
Lower stage (VIII-X)				
General	6 894	10 540	14 643	22 575
Vocational	1 535	3 268	5 820	9 095
Total (VIII-X)	8 429	13 808	20 463	31 670
Upper stage (XI-XII)				
General	1 427	2 360	3 456	4 894
Technical and vocational	644	1 368	2 316	3 231
Teacher training ¹	449	546	417	266
Total (XI-XII)	2 520	4 274	6 189	8 391
Total (VIII-XII)	10 949	18 082	26 652	40 061
Enrolment ratio	13.81%	18.25%	23.38%	31.32%
Proportion of all levels	11.7%	13.5%	15.3%	17.6%
THIRD LEVEL (XIII+)				
Teacher training (XIII-XIV)	37	117	130	88
Technical course (XIII-XIV)	33	128	307	574
Science and other (XIII+) ²	586	992	1 464	1 805
Arts and other (XIII+) ³	764	1 213	1 653	1 922
Total (XIII+)	1 420	2 450	3 554	4 389
Enrolment ratio	2.79%	3.88%	4.65%	4.92%
Proportion of all levels	1.5%	1.9%	2.0%	1.9%
TOTAL (ALL LEVELS)	93 573	133 450	174 561	227 736
IN-SERVICE TRAINING				
First-level teachers	—	502	630	695
Second-level teachers	—	121	167	216
Total	—	623	797	911

TABLE 19 (cont.)

Level of education	1964	1970	1975	1980
GROUP C				
FIRST LEVEL (I-VII)				
Grades I-V	18 394	22 639	26 493	30 001
Enrolment ratio	101.43%	103.84%	106.30%	104.71%
Grades I-VII	21 730	27 394	33 026	38 902
Enrolment ratio	88.83%	92.89%	97.85%	100.21%
Proportion of all levels	84.7%	82.9%	80.6%	78.3%
SECOND LEVEL (VIII-XII)				
Lower stage (VIII-X)				
General	2 266	3 150	4 033	5 899
Vocational	177	652	1 461	1 888
Total (VIII-X)	2 443	3 802	5 494	7 787
Upper stage (XI-XII)				
General	502	656	929	1 151
Technical and vocational	403	453	626	768
Teacher training ¹	82	58	32	37
Total (XI-XII)	987	1 167	1 587	1 956
Total (VIII-XII)	3 430	4 969	7 081	9 743
Enrolment ratio	24.92%	28.85%	35.34%	44.76%
Proportion of all levels	13.4%	15.0%	17.3%	19.6%
THIRD LEVEL (XIII+)				
Teacher training (XIII-XIV)	30	61	54	73
Technical course (XIII-XIV)	14	42	91	118
Science and other (XIII+) ²	163	257	377	458
Arts and other (XIII+) ³	292	317	333	369
Total (XIII+)	499	677	855	1 018
Enrolment ratio	5.73%	6.05%	6.22%	6.34%
Proportion of all levels	1.9%	2.1%	2.1%	2.1%
TOTAL (ALL LEVELS)	25 659	33 040	40 962	49 663
IN-SERVICE TRAINING				
First-level teachers	—	128	149	156
Second-level teachers	—	29	41	55
Total	—	157	190	211

TABLE 19 (cont.)

Level of education	1964	1970	1975	1980
THE REGION				
FIRST LEVEL (I-VII)				
Grades I-V	90 767	121 470	149 583	181 411
Enrolment ratio	71.50%	81.65%	90.42%	99.53%
Grades I-VII	103 769	141 672	179 420	225 154
Enrolment ratio	60.66%	70.32%	79.68%	90.32%
Proportion of all levels	86.4%	84.3%	82.4%	80.2%
SECOND LEVEL (VIII-XII)				
Lower stage (VIII-X)				
General	9 197	13 787	18 850	28 760
Vocational	1 722	3 946	7 325	11 051
Total (VIII-X)	10 919	17 733	26 175	39 811
Upper stage (XI-XII)				
General	1 935	3 032	4 418	6 105
Technical and vocational	1 048	1 826	2 959	4 037
Teacher training ¹	534	611	459	319
Total (XI-XII)	3 517	5 469	7 836	10 461
Total (VIII-XII)	14 436	23 202	34 011	50 272
Enrolment ratio	15.13%	19.52%	24.84%	32.55%
Proportion of all levels	12.0%	13.8%	15.6%	17.9%
THIRD LEVEL (XIII+)				
Teacher training (XIII-XIV)	68	179	185	164
Technical course (XIII-XIV)	47	171	402	701
Science and other (XIII+) ²	751	1 252	1 851	2 278
Arts and other (XIII+) ³	1 059	1 534	1 998	2 311
Total (XIII+)	1 925	3 136	4 436	5 454
Enrolment ratio	3.02%	3.95%	4.65%	4.96%
Proportion of all levels	1.6%	1.9%	2.0%	1.9%
TOTAL (ALL LEVELS)	120 130	168 010	217 867	280 880
IN-SERVICE TRAINING				
First-level teachers	—	636	787	861
Second-level teachers	—	151	210	274
Total	—	787	997	1 135

1. Includes enrolment in the teacher-training (Grade XIII) continuation course. This enrolment, however, while excluded from third-level (XIII+) enrolment totals, figures in the calculations at third-level enrolment ratios.

2. Science, science-based and technological education.

3. Arts, humanities, social sciences, education, etc.

TABLE 20. Teacher stock and requirements for additional teachers:
(a) estimated number of total teachers required in service and
(b) estimated number of additional teachers required for new
enrolment and replacement, 1964 (base year), 1970, 1975 and 1980
(in thousands)

Level and type of education	1964	1970	1975	1980
GROUP A				
FIRST LEVEL (I-VII)				
Total stock	23.2	37.8	51.0	65.9
Total requirement for additional teachers	3.4	5.9	5.9	8.5
From general (X) ¹	(2.0)	(2.2)	(0.9)	(—)
From teacher training (XII)	(1.0)	(2.3)	(3.2)	(5.1)
From teacher training (XIII)	(0.1)	(0.7)	(1.0)	(1.7)
From teacher training (XIV)	(0.2)	(0.5)	(0.6)	(1.3)
From university	(0.1)	(0.2)	(0.2)	(0.4)
SECOND LEVEL (VIII-XII)				
<i>Lower stage (VIII-X)</i>				
Teacher stock				
General	1.9	5.1	8.7	11.4
Vocational	1.0	1.7	2.2	3.4
Total (VIII-X)	2.9	6.8	10.9	14.8
Requirements for additional teachers				
General	0.5	1.0	0.9	1.6
Vocational	0.3	0.2	0.3	0.5
Total (VIII-X)	0.8	1.2	1.2	2.1
<i>Upper stage (XI-XII)</i>				
Teacher stock				
General	0.4	0.9	1.7	3.0
Technical and vocational	0.1	0.3	0.8	1.9
Teacher training ²	0.2	0.4	0.4	0.6
Total (XI-XII)	0.7	1.6	2.9	5.5
Requirements for additional teachers				
General	—	0.2	0.3	0.6
Technical and vocational	—	0.1	0.2	0.4
Teacher training	0.1	—	0.1	—
Total (XI-XII)	0.1	0.3	0.6	1.0
Total second level (VIII-XII)	3.6	8.4	13.8	20.3
Teacher stock	0.9	1.5	1.8	3.1
Requirements for additional teachers				
THIRD LEVEL (XIII+)				
Teacher stock				
Sciences and technological (XIII+) and technical course (XIII-XIV)	0.2	0.3	1.2	2.0
Arts and other (XIII+) and teacher training (XIII-XIV)	0.1	0.3	0.6	1.1
Total (XIII+)	0.3	0.6	1.8	3.1

TABLE 20 (cont.)

Level and type of education	1964	1970	1975	1980
Requirements for additional teachers				
Sciences and technological (XIII+) and technical course XIII-XIV	—	0.1	—	—
Arts and other (XIII+) and teacher training (XIII-XIV)	0.1	0.1	0.1	0.2
Total (XIII+)	0.1	0.2	0.1	0.2
TOTAL (ALL LEVELS)				
Teacher stock	27.1	46.8	66.6	89.3
Requirements for additional teachers	4.4	7.6	7.8	11.8
From university	(0.9)	(1.8)	(2.4)	(4.0)
GROUP B				
FIRST LEVEL (I-VII)				
Total stock	2 137	2 972	3 609	4 073
Total requirement for additional teachers	246	290	224	144
From general (X) ¹	(37)	(14)	(—)	(—)
From teacher training (XII)	(130)	(102)	(22)	(—)
From teacher training (XIII)	(52)	(102)	(119)	(87)
From teacher training (XIV)	(15)	(52)	(61)	(43)
From university	(12)	(20)	(22)	(14)
SECOND LEVEL (VIII-XII)				
<i>Lower stage (VIII-X)</i>				
Teacher stock				
General	276	422	586	752
Vocational	85	142	233	364
Total (VIII-X)	361	564	819	1 116
Requirements for additional teachers				
General	32	48	41	79
Vocational	12	18	29	38
Total (VIII-X)	44	66	70	117
<i>Upper stage (XI-XII)</i>				
Teacher stock				
General	71	103	138	196
Technical and vocational	43	72	116	162
Teacher training ²	25	25	17	11
Total (XI-XII)	139	200	271	369

TABLE 20 (cont.)

Level and type of education	1964	1970	1975	1980
Requirements for additional teachers				
General	14	10	15	25
Technical and vocational	11	9	12	21
Teacher training	2	-1	2	0.5
Total (XI-XII)	27	18	29	47
Total second level (VIII-XII)				
Teacher stock	500	764	1 090	1 485
Requirements for additional teachers	71	84	99	164
THIRD LEVEL (XIII+)				
Teacher stock				
Sciences and technological (XIII+) and technical course (XIII-XIV)	56	93	148	198
Arts and other (XIII+) and teacher training (XIII-XIV)	35	60	81	91
Total (XIII+)	91	153	229	289
Requirements for additional teachers				
Sciences and technological (XIII+) and technical course (XIII-XIV)	6	12	15	18
Arts and other (XIII+) and teacher training (XIII-XIV)	4	6	6	6
Total (XIII+)	10	18	21	24
TOTAL (ALL LEVELS)				
Teacher stock	2 728	3 889	4 928	5 847
Requirements for additional teachers	327	392	344	332
From university	(94)	(122)	(143)	(202)
GROUP C				
FIRST LEVEL (I-VII)				
Total stock	572	721	826	864
Total requirements for additional teachers	50	55	42	59
From general (X) ¹	(2.5)	(—)	(—)	(—)
From teacher training (XII)	(15)	(3)	(—)	(—)
From teacher training (XIII)	(15)	(16)	(11)	(12)
From teacher training (XIV)	(12.5)	(29)	(25)	(35)
From university	(5.0)	(7)	(6)	(12)
SECOND LEVEL (VIII-XII)				
Lower stage (VIII-X)				
Teacher stock				
General	76	105	134	197
Vocational	8.4	27	58	75
Total (VIII-X)	84	132	192	272

TABLE 20 (cont.)

Level and type of education	1964	1970	1975	1980
Requirements for additional teachers				
General	6.1	9.8	12	22
Vocational	2.9	5.2	8.0	7.5
Total (VIII-X)	9.0	15	20	30
Upper stage (XI-XII)				
Teacher stock				
General	20	26	37	46
Technical and vocational	20	23	31	38
Teacher training ²	4.8	2.6	1.3	1.5
Total (XI-XII)	45	52	69	87
Requirements for additional teachers				
General	1.0	3.4	2.8	7.1
Technical and vocational	0.5	2.8	2.2	5.9
Teacher training	—	-0.3	—	0.1
Total (XI-XII)	1.5	5.9	5.0	13
Total second level (VIII-XII)				
Teacher stock	129	184	261	359
Requirements for additional teachers	11	21	25	43
THIRD LEVEL (XIII+)				
Teacher stock				
Sciences and technological (XIII+) and technical course (XIII-XIV)	15	25	39	48
Arts and other (XIII+) and teacher training (XIII-XIV)	14	17	18	20
Total (XIII+)	29	42	57	68
Requirements for additional teachers				
Sciences and technological (XIII+) and technical course (XIII-XIV)	3.0	2.6	4.7	2.8
Arts and other (XIII+) and teacher training (XIII-XIV)	2.0	0.4	0.9	1.0
Total (XIII+)	5.0	3.0	5.6	3.8
TOTAL (ALL LEVELS)				
Teacher stock	730	947	1 144	1 290
Requirements for additional teachers	66	79	73	106
From university	(20)	(31)	(37)	(59)
THE REGION				
FIRST LEVEL (I-VII)				
Total stock	2 732	3 731	4 486	5 003
Total requirement for additional teachers	300	351	272	212
From general (X) ¹	(42)	(16)	(1)	(—)
From teacher training (XII)	(146)	(107)	(25)	(5)
From teacher training (XIII)	(67)	(119)	(131)	(101)
From teacher training (XIV)	(28)	(82)	(87)	(79)
From university	(17)	(27)	(28)	(27)

TABLE 20 (cont.)

Level and type of education	1964	1970	1975	1980
SECOND LEVEL (VIII-XII)				
<i>Lower stage (VIII-X)</i>				
Teacher stock				
General	354	532	729	960
Vocational	94	171	293	443
Total (VIII-X)	448	703	1 022	1 403
Requirements for additional teachers				
General	39	59	54	103
Vocational	15	23	37	46
Total (VIII-X)	54	82	91	149
<i>Upper stage (XI-XII)</i>				
Teacher stock				
General	91	130	177	245
Technical and vocational	63	95	148	202
Teacher training ²	30	28	19	13
Total (XI-XII)	4	253	344	460
Requirements for additional teachers	18			
General	15	14	18	33
Technical and vocational	12	11	15	27
Teacher training	2.1	-1	2.1	0.6
Total (XI-XII)	29	24	35	61
Total second level (VIII-XII)	632	956	1 366	1 864
Teacher stock	56	106	126	210
Requirements for additional teachers				
THIRD LEVEL (XIII+)				
Teacher stock				
Sciences and technological (XIII+) and technical course (XIII-XIV)	71	118	188	248
Arts and other (XIII+) and teacher training (XIII-XIV)	49	77	100	112
Total (XIII+)	120	195	288	360
Requirements for additional teachers				
Sciences and technological (XIII+) and technical course (XIII-XIV)	9.0	15	20	21
Arts and other (XIII+) and teacher training (XIII-XIV)	6.1	6.5	7.0	7.2
Total (XIII+)	15	21	27	28
TOTAL (ALL LEVELS)				
Teacher stock	3 484	4 882	6 140	7 227
Requirements for additional teachers	371	479	425	450
From university	(115)	(155)	(182)	(265)

Costs and expenditure

This section is concerned with estimating the unit costs of education as envisaged in the Model. The concept of costs as used here is not exactly identical with the concept of costs in the strict economic sense. It does not cover the cost of boarding, clothing and accommodation borne by the family. Also opportunity costs, representing the estimated loss of income from foregone employment opportunities or, in case of capital costs, from not devoting these resources to alternative investment projects, are not included.

A distinction also needs to be made between costs and expenditure. The former corresponds to what should normally be the value of goods or services and the latter to what is actually spent. The concept of cost is useful for long-term planning while expenditure is valid for allocation analysis.

The purpose of the following cost estimates is to quantify the possible financial implications of the educational targets. The actual expenditures that may be necessary may vary according to circumstances. For example, the services of a teacher have been valued at a standard rate estimated from present salary. If, however, a volunteer teacher were used, the actual expenditures would of course be far lower than the standard salary used in the model.

Data for the base year or as near it as possible for each group of countries in the region have formed the basis for estimating future costs. They are presented in terms of United States dollars and as such are to be interpreted subject to the limitations inherent in this procedure.

The estimates of costs are based on the assumption of a constant price level. Movement in prices will obviously imply the need for corresponding adjustment. In this context it may be pointed out that in the past teachers' salaries have not been always adequately adjusted to the increase in the cost of living.

Recurring costs (Table 23)

The basic unit used for the analysis of recurring costs is the cost per pupil. It is affected by three main factors: the average annual salary of teachers, the pupil-teacher ratio and the proportion of teacher salaries to total recurring costs. Recurring costs other than salaries include charges for that part of general administration and supervision which can be allocated by level and type of education, maintenance and operation of educational establishments, instructional materials and school libraries and salaries of non-teaching staff. The per pupil cost

1. Indicates the training levels from which primary teachers would be drawn.
2. Includes teacher-training continuation course (Grade XIII).

TABLE 21. Estimated output of teachers by qualification, 1970, 1975 and 1980 (in thousands)

Level of education and qualifications	1970				1975				1980			
	Total	Group A	Group B	Group C	Total	Group A	Group B	Group C	Total	Group A	Group B	Group C
Additional teachers for first level of education (primary)												
From general (7+3 years education)	16	2	14	—	1	1	—	—	—	—	—	—
From teacher training (10+2 years education)	107	2	102	3	25	3	22	—	5	5	—	—
From teacher training (10+3 years education)	119	1	102	16	131	1	119	11	101	2	87	12
From teacher training (12+2 years education)	82	1	52	29	87	1	61	25	79	1	43	35
From third level (16 years or more education)	27	0.2	20	7	28	0.2	22	6	27	0.4	14	12
Total	351	6	290	55	272	6	224	42	212	8	144	59
Additional teachers for second level of education												
From third level (16 years or more)	106	1.5	84	21	126	2	99	25	210	3	164	43
Additional teachers for third level of education												
From third level (16 years or more)	21	0.2	18	3	27	0.1	21	6	28	0.2	24	4
Total number of additional teachers with less than 16 years	324	6	270	48	244	6	202	36	185	8	130	47
Total number of additional teachers with third-level education (16 years or more)	155	2	122	31	182	2	143	37	265	4	202	59
Total output of teachers	479	8	392	79	426	8	344	73	450	12	332	106

thus includes elements that are minimally essential for, and directed to, instructional work. They do not include ancillary or welfare services such as school meals, school uniforms, teacher housing, transportation, etc., which, desirable as they are, form more appropriately part of the over-all national welfare programme in which they could be costed.

Provision of free textbooks in primary schools is of special importance. The experience of certain countries in the region indicates that the cost of textbooks in the first level of school education is about \$1 per child per year. It has been assumed that in 1980 all pupils in primary schools should receive free textbooks.

The cost of central administration not allocated by level and type of education was assumed to be 1 per cent of total recurring costs for all levels of education, excluding stipends.

The provision of teachers' salaries¹ is the most important item in recurring costs. The salaries of teachers vary over a wide range from one country in Asia to another as well as from one level of education to another. In making assumptions about the future levels of teachers'

salaries, three factors have to be taken into account: (a) a general rise as a consequence of economic growth

TABLE 22. Estimated number of supervisors in service, 1964, 1970, 1975 and 1980¹

	1964	1970	1975	1980
Group A				
First level	160	290	430	600
Second level	10	30	50	80
Group B				
First level	15 000	23 000	30 000	37 000
Second level	1 500	2 500	4 000	6 000
Group C				
First level	4 000	6 000	7 000	8 000
Second level	400	600	1 000	1 500
The region				
First level	19 160	29 290	37 430	45 600
Second level	1 910	3 130	5 050	7 580

1. For assumptions used, see Appendix B.

1. Salaries here refer to gross salaries which include pension contributions, etc.

TABLE 23. Recurring costs per pupil, 1964 and 1980 (in U.S. dollars at constant prices)

	Group A		Group B		Group C	
	1964	1980	1964	1980	1964	1980
FIRST LEVEL (I-VII)						
Annual salary per teacher	\$240	\$372	\$258	\$400	\$580	\$783
Proportion increase	100%	155%	100%	155%	100%	135%
Pupil-teacher ratio	36	45	38	45	38	45
Teacher-salaries as a proportion of 'total' costs ¹	85%	80%	85%	80%	85%	80%
Per-pupil cost of textbooks	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00
Proportion of pupils receiving free textbooks	15%	100%	15%	100%	15%	100%
Per-pupil cost	\$8.00	\$11.30	\$8.15	\$12.10	\$18.10	\$22.75
Teacher-salaries	6.65	8.25	6.80	8.90	15.25	17.40
'Other' costs	1.20	2.05	1.20	2.20	2.70	4.35
Textbooks	0.15	1.00	0.15	1.00	0.15	1.00
SECOND LEVEL (VIII-XII)						
LOWER STAGE (VIII-X)						
<i>General</i>						
Annual salary per teacher	\$450	\$652	\$680	\$918	\$900	\$1 134
Proportion increase	100%	145%	100%	135%	100%	126%
Pupil-teacher ratio	19	25	25	30	30	30
Teacher-salaries as a proportion of 'total' costs ¹	80%	75%	80%	75%	80%	75%
Per-pupil cost	\$29.60	\$34.80	\$34.00	\$40.80	\$37.50	\$50.40
Teacher-salaries	23.70	26.10	27.20	30.60	30.00	37.80
'Other' costs	5.90	8.70	6.80	10.20	7.50	12.60
<i>Vocational</i>						
Annual salary per teacher	\$450	\$652	\$680	\$918	\$900	\$1 134
Proportion increase	100%	145%	100%	145%	100%	126%
Pupil-teacher ratio	10	20	18	25	21	25
Teacher-salaries as a proportion of 'total' costs ¹	70%	65%	70%	65%	70%	65%
Per-pupil cost	\$64.30	\$50.15	\$54.00	\$56.45	\$61.20	\$69.75
Teacher-salaries	45.00	32.60	37.80	36.70	42.85	45.35
'Other' costs	19.30	17.55	16.20	19.75	18.35	24.40
UPPER STAGE (XI-XII)						
<i>General</i>						
Annual salary per teacher	\$450	\$652	\$680	\$918	\$900	\$1 134
Proportion increase	100%	145%	100%	145%	100%	126%
Pupil-teacher ratio	15	20	20	25	25	25
Teacher-salaries as a proportion of 'total' costs ¹	80%	75%	80%	75%	80%	75%
Per-pupil cost	\$37.50	\$43.45	\$42.50	\$48.95	\$45.00	\$60.45
Teacher-salaries	30.00	32.60	34.00	36.70	36.00	45.35
'Other' costs	7.50	10.85	8.50	12.25	9.00	15.10
<i>Technical and vocational</i>						
Annual salary per teacher	\$950	\$1 197	\$1 020	\$1 285	\$1 425	\$1 795
Proportion increase	100%	126%	100%	126%	100%	126%
Pupil-teacher ratio	10	20	15	20	20	20
Teacher-salaries as a proportion of 'total' costs ¹	65%	60%	62%	60%	62%	60%

TABLE 23 (cont.)

	Group A		Group B		Group C	
	1964	1980	1964	1980	1964	1980
Per-pupil cost	\$146.15	\$99.75	\$109.70	\$107.10	\$114.90	\$149.50
Teacher-salaries	95.00	59.85	68.00	64.25	71.25	89.75
'Other' costs	51.15	39.90	41.70	42.85	43.65	59.75
<i>Teacher training²</i>						
Annual salary per teacher	\$800	\$1 008	\$940	\$1 184	\$1 100	\$1 386
Proportion increase	100%	126%	100%	126%	100%	126%
Pupil-teacher ratio	14	25	18	25	17	25
Teacher-salaries as a proportion of 'total' costs ¹	75%	70%	75%	70%	70%	65%
Per-pupil cost	\$76.20	\$57.55	\$69.60	\$67.65	\$92.45	\$85.30
Teacher-salaries	57.15	40.30	52.20	47.35	64.70	55.45
'Other' costs	19.05	17.25	17.40	20.30	27.75	29.85
Stipends	\$120	\$120	\$150	\$150	\$300	\$300
Proportion of pupils receiving stipends	30%	100%	30%	100%	30%	100%
<i>In-service training for primary school teachers</i>						
Salary per teacher ³	\$133	\$168	\$157	\$197	\$183	\$231
Pupil-teacher ratio	30	30	30	30	30	30
Teacher-salaries as a proportion of 'total' costs ¹	70%	70%	70%	70%	70%	70%
Per-pupil cost	\$22.35	\$24.00	\$25.45	\$27.35	\$28.70	\$31.00
Teacher-salaries	4.45	5.60	5.20	6.55	6.10	7.70
'Other' costs	1.90	2.40	2.25	2.80	2.60	3.30
Per diem and transportation	16.00	16.00	18.00	18.00	20.00	20.00
THIRD LEVEL (XIII +)						
<i>Science, science based and technological and technical (XIII-XIV)</i>						
Annual salary per teaching staff	\$2 000	\$2 520	\$2 000	\$2 520	\$2 240	\$2 822
Proportion increase	100%	126%	100%	126%	100%	126%
Student-teaching staff ratio	11	12	11	12	12	12
Teaching staff salaries as a proportion of 'total' costs ¹	60%	55%	60%	55%	60%	55%
Per-student cost	\$303	\$382	\$303	\$382	\$311	\$427
Teaching-staff salaries	182	210	182	210	187	235
'Other' costs	121	172	121	172	124	192
<i>Arts, humanities, social sciences, etc. (XIII +) and teacher training (XIII-XIV)</i>						
Annual salary per teaching staff	\$2 000	\$2 520	\$2 000	\$2 520	\$2 240	\$2 822
Proportion increase	100%	126%	100%	126%	100%	126%
Student-teaching staff ratio	23	22	23	22	23	22
Teaching-staff salaries as a proportion of 'total' costs ¹	70%	70%	70%	70%	70%	70%
Per-student cost	\$124	\$164	\$124	\$164	\$139	\$183
Teaching-staff salaries	87	115	87	115	97	128
'Other' costs	37	49	37	49	42	55

TABLE 23 (cont.)

	Group A		Group B		Group C	
	1964	1980	1964	1980	1964	1980
<i>In-service training for second-level school teachers</i>						
Salary per teaching staff ³	\$333	\$420	\$333	\$420	\$373	\$470
Student-teaching staff ratio	30	30	30	30	30	30
Salaries as a proportion of 'total' costs ¹	70%	70%	70%	70%	70%	70%
Per-student cost	\$40.85	\$45.00	\$45.85	\$50.00	\$52.80	\$57.35
Teaching-staff salaries	11.10	14.00	11.10	14.00	12.45	15.65
'Other' costs	4.75	6.00	4.75	6.00	5.35	6.70
Per diem and transportation	35.00	25.00	30.00	30.00	35.00	35.00

1. 'Total' costs as used here include teacher-salaries, other personnel costs, that part of general administration and supervision allocated by levels and type of education, maintenance and operation of educational establishments and instructional material other than textbooks. 'Other' costs include all of the items included in 'total' costs except teacher-salaries. Central administration not allocated by level and type of education was included in the over-all total recurring costs for all levels and types at the rate of 1% of total all-level recurring costs, including textbooks but excluding stipends.

2. Including the teacher-training continuation course, Grade XIII.

3. Since the in-service training course is assumed to be of two-months' duration per

year the salary per teaching staff was calculated on the basis of two-twelfths of the annual salary of teachers from the relevant level and type.

General note. The estimates of 1964 unit recurring costs, teachers' salaries, proportion of salaries to 'total' cost, etc., were based on available data from each country, the source in most cases being 'Reports of the Unesco Regional Advisory Team for Educational Planning in Asia', Unesco Regional Office for Education in Asia, Bangkok, 1965. Proportion of pupils receiving free textbooks at the first level in 1964 and proportion receiving stipends in teacher training are estimated. Figures in national currency have been converted into United States dollars at the exchange rates prevailing in December 1964.

and higher standards of living by which the relative position of the teachers might be adversely affected unless compensated; (b) an increase due to contemplated shift of required qualification, both pre-service and in-service, from a lower to a higher level; and (c) in countries where salaries are unduly depressed in comparison with other similar occupations, increases to attract to education a due share of higher level ability.

Educational development is envisaged as resulting from the interaction of qualitative improvement and quantitative expansion. The teacher being the decisive factor in qualitative improvement, it was assumed for purpose of cost estimates that at the school level the rise in teachers' salaries will be linked to a higher shift in required qualifications. In countries of Group C this trend towards a higher requirement of teacher qualification is already evident. In Group A and B it is not generally so and low teacher qualification is combined with a depressed level of salaries. Therefore, the order of increase for the three groups will necessarily vary, but it is expected that the gap between one group and another will be progressively narrowed as development proceeds. The difference between salaries at the various levels is also expected to be reduced in line with an observed long-term trend.

Improvement is needed in the countries of the region in the provision of school libraries and instructional and audio-visual aids to increase the effectiveness of the teacher and considerable strengthening is required in the

science teaching programme. The role of libraries in schools and colleges is of central importance in developing a dynamic teaching-learning programme based on fostering initiative and the spirit of inquiry, and should be especially stressed in all types and levels of education. Educational administration and supervision is another key area for promoting qualitative improvement. For these reasons it was assumed that, for the purpose of qualitative improvement, the proportion of teachers' salaries to total recurring costs will be lower. In this sense this proportion can also be a measure of qualitative improvement.

The pupil-teacher ratio is another important determinant of the level of recurring costs. The ratio of pupils to teachers becomes smaller as one goes up the educational ladder. This is largely due to increasing specialization in teaching at the second and third levels. That a smaller pupil-teacher ratio by itself makes for quality is unproved and research studies tend to show that the two are not necessarily correlated. The question is also to be viewed in relation to another factor that determines the total costs of the educational system, i.e., population of the school-age group. A considerable increase in school-age population is anticipated during the period in almost all countries in the region. In the circumstances, a higher pupil-teacher ratio is strongly indicated. In order to minimize any possible disadvantage, it would be more appropriate to give higher priority to having better trained and qualified teachers adequately equipped with instructional aids.

TABLE 24. Capital costs per pupil-place, Group A, B and C, 1964-80 (in U.S. dollars at constant prices)

	Net building cost per sq.m. \$	Area per pupil-place sq.m.	Net building cost per pupil-place \$	Site costs ¹ \$	Furniture and equipment \$	Total \$
FIRST LEVEL (I-VII)	27	1.3	35	4	7	46
SECOND LEVEL (VIII-XII)						
Lower stage (VIII-X)						
General	40	3.0	120	36	30	186
Vocational	40	4.0	160	48	53	261
Upper stage (XI-XII)						
General	40	3.0	120	36	30	186
Technical	40	5.0	200	60	86	346
Teacher training ²	40	3.0	120	36	30	186
Residential facilities for pupils, teacher training ³	45	13.0	585	175	180	940
THIRD LEVEL (XIII +)						
Science, science-based and technological (XIII +) and technical (XIII-XIV)	60	16.0	960	480	640	2 080
Art, humanities, social sciences, etc. (XIII +) and teacher training (XIII-XIV)	60	6.0	360	180	120	660
Residential facilities for students, third level ⁴	55	13.0	715	357	225	1 297

1. Land and 'additional' costs. Explanation of 'additional' costs is shown in Chapter 2, Formula E-8.

2. Including the teacher-training continuation course, Grade XIII.

3. Proportion of students for whom residence is provided: 1964, 15%; 1980, 80%.

4. Proportion of students for whom residence is provided: 1964, 10%; 1980, 30%.

General note. The estimates of 1964 capital costs per pupil-place and their components were based on the 'Reports of the Unesco Regional Advisory Team for

Educational Planning in Asia' and on a survey conducted by the Asian Regional Institute for School Building Research.

Replacement of existing pupil-places and student residences was based on the assumption of replacing all 1964 first-level pupil-places by 1980, and using a gradually increasing replacement rate for 1964 second and third level pupil-places and student residences that reaches 2 per cent for second level and 1 per cent for third level by 1980.

Capital costs (Table 24)

Capital costs comprise costs of buildings (including land and land preparation) and of equipment for the additional enrolments at all levels and for replacement of existing buildings and equipment. Contrary to what happens in recurring costs, capital costs in constant prices have no inherent tendency to rise. On the one hand, they may decrease as a result of improved productivity and better designing, but on the other hand rising standards and new needs may cause the opposite effect. Functional designing of school buildings is gaining ground and, as proved by the experience of some countries, not only makes substantial economies possible but also helps in developing flexibility so essential in instructional programmes.

For estimating the capital costs, four elements have been taken into account: the desirable area per pupil including school and common services, the net building cost per unit of area, the cost of site and the cost of furniture and equipment. The cost of construction will show much wider variation from country to country depending on materials and standards of design than variation in the minimum requirements of area per pupil. The assumptions used concerning the floor area and the cost at the various levels are given in Table 24.

Teacher-training institutions at the second level are largely residential and therefore the total cost is high. The Karachi Plan assumed a teacher-training institution to have on an average 200 trainees. A large-size institution has been assumed here both from the point of view of instructional efficiency and economy. The estimated space

requirement, the net building cost per pupil place, the cost of site and the cost of furniture and equipment are assumed to be the same as in the general secondary schools. Moreover, it has been assumed that accommodation should be provided for 80 per cent of students.

Houses for teachers have not been taken into account in the total estimated costs, the assumption being that teachers' housing should be covered by the over-all housing programme. Many countries in the region have the 'shift system' in schools enabling two batches of pupils or students to make use of the same premises and equipment. In these estimates, however, the 'one shift system' is assumed.

Possible economies in the costs of education

Education is a large consumer of resources and it is therefore necessary that efforts should constantly be made to achieve economies which do not affect instructional efficiency and quality.

1. The development of alternative avenues to education, particularly at the second and third levels, for people who are not in a position to avail themselves of the institutional opportunities, needs urgent attention. These alternative ways comprise part-time education, evening schools and colleges and instruction by correspondence, combined appropriately with mass media of communication. They are not only economical but also help in extending the range of education. In some advanced countries, correspondence courses are already well established and have proved their efficacy. A few countries in the region have started experiments in this direction, and it is suggested that the experience thus gained could form the basis for further development.
2. Considerable savings in monetary terms could be effected by mobilizing local and community resources of labour and materials either for buildings or for teaching. Many Asian countries have acquired a great deal of experience in this area and found that it also helps to bring the school closer to the community.
3. The size of an institution is an important factor in the cost of education. There is in some countries of the region a tendency to favour relatively small institutions, particularly at the third level. There is a growing body of experience to show that larger institutions are not only economical but also make for instructional efficiency. Studies on the 'optimum' size of institutions at different levels are urgently needed in the region.
4. Multi-purpose use of school buildings is another

means of ensuring economy through maximizing their utilization. Especially, it is highly desirable that educational buildings are used extensively in adult education programmes.

5. The establishment of co-educational schools wherever feasible and opening of boys' schools to girls can be a means of economising on school buildings and equipment, particularly in the case of costly institutions such as technical and vocational schools.

Capital cost could be reduced by employing a better designed system of control and development. Control implies the determination, through legislation, of a maximum unit cost coupled with a minimum unit standard of accommodation, leaving to the architect and educator room for adjustment between the floor of standards and the ceiling of cost limits so as to produce the best possible schools at a price that the State can afford. With this, the techniques of development would ensure that the desired targets of cost and facilities can in fact be attained before the State embarks on its construction programmes. Development includes the design of a prototype, its construction and evaluation before multiplication.

Both control and development may affect the existing administrative procedures with regard to the allocation of responsibilities for buildings, the legislation on schools buildings, and so on.

It is suggested that Member States investigate the factors concerning their school building investment programmes and design a plan which might be along the following lines: (a) a study of the factors affecting the control of construction; (b) a study of the legislation relating to school buildings (building by-laws), financial regulations, etc.; (c) a study of the design, costing and construction procedures in the office of the constructing agency; (d) a study of the implications of adopting the ideas of control and development.

These studies would be followed by a plan to incorporate the control and development concepts into the organizational policies of the constructing agency, the plan being supported by legislation to make it effective.

Considering the size of the building industry and its need for modernization, it is also suggested that vocational training in this field be linked to the school-building programme by a scheme of productive vocational training schools. Although this would not meet the entire construction programmes, it would have the great advantage of providing students with opportunities to improve their experience and to study modern techniques of full-scale production, instead of practising outmoded methods and carrying out artificial exercises.

TABLE 25. Estimated total costs by levels and types of education, 1964, 1970, 1975 and 1980 (in thousand dollars)

Level and type of education	1964 (base year)					1970				
	Recurring cost \$	Stipends \$	Total recurring cost \$	Capital cost \$	Total cost \$	Recurring cost \$	Stipends \$	Total recurring cost \$	Capital cost \$	Total cost \$
GROUP A										
FIRST LEVEL (I-VII)	6 683	.	6 683	3 405	10 088	12 386	.	12 386	7 120	19 506
SECOND LEVEL (VIII-XII)										
Lower stage (VIII-X)										
General	1 082	.	1 082			3 046	.	3 046		
Vocational	638	.	638			1 509	.	1 509		
Total (VIII-X)	1 720	.	1 720	1 987	3 707	4 555	.	4 555	3 482	8 037
Upper stage (XI-XII)										
General	222	.	222			651	.	651		
Technical and vocational	163	.	163			638	.	638		
Teacher training ¹	213	101	314			458	320	778		
In-service training for primary school teachers	—	.	—	.	—	132	.	132		
Total (XI-XII)	598	101	699	139	838	1 879	320	2 199	1 151	3 350
Total second level (VIII-XII)	2 318	101	2 419	2 126	4 545	6 434	320	6 754	4 633	11 387
THIRD LEVEL (XIII +)										
Science and technological (XIII +) and technical course (XIII-XIV)	600	.	600	170	770	1 218	.	1 218	3 269	4 487
Arts and other (XIII +) and teacher training (XIII-XIV)	450	.	450	380	830	763	.	763	881	1 644
In-service training for second level teacher	—	.	—	.	—	51	.	51	—	51
Total third level (XIII +)	1 050	.	1 050	550	1 600	2 032	.	2 032	4 150	6 182
TOTAL (ALL LEVELS)	10 051	101	10 152	6 081	16 233	20 852	320	21 172	15 903	37 075
Administrative	10	.	10	.	10	21	.	21	.	21
Student residences	.	.	.	152	152	.	.	.	572	572
Total	10 061	101	10 162	6 233	16 395	20 873	320	21 193	16 475	37 668

Resources and financing (Tables 25 and 26)

The feasibility of the Model has to be assessed in the light of resources likely to be available in future. At present the share of educational expenditure in GNP varies signifi-

cantly from country to country in the region. In 1964 it formed on the average less than 3 per cent in Group B and well below 5 per cent in Group C.

The projections presented in the preceding paragraphs represent in certain respects the telescoping into a period

1975					1980				
Recurring cost \$	Stipends \$	Total recurring cost \$	Capital cost \$	Total cost \$	Recurring cost \$	Stipends \$	Total recurring cost \$	Capital cost \$	Total cost \$
20 675	.	20 675	9 346	30 021	33 516	.	33 516	11 750	45 266
5 759	.	5 759			9 936	.	9 936		
2 373	.	2 373			3 416	.	3 416		
8 132	.	8 132	4 629	12 761	13 352	.	13 352	6 711	20 063
1 387	.	1 387			2 596	.	2 596		
1 857	.	1 857			3 811	.	3 811		
634	787	1 421			934	1 947	2 881		
195	.	195			247	.	247		
4 073	787	4 860	2 382	7 242	7 588	1 947	9 535	3 831	13 366
12 205	787	12 992	7 011	20 003	20 940	1 947	22 887	10 542	33 429
4 972	.	4 972	4 558	9 530	9 279	.	9 279	5 726	15 005
1 920	.	1 920	1 069	2 989	3 812	.	3 812	1 787	5 599
86	.	86		86	130	.	130		130
6 978	.	6 978	5 627	12 605	13 221	.	13 221	7 513	20 734
39 858	787	40 645	21 984	62 629	67 677	1 947	69 624	29 805	99 429
40	.	40		40	68	.	68		68
	.		1 280	1 280		.		2 580	2 580
39 898	787	40 685	23 264	63 949	67 745	1 947	69 692	22 385	102 077

of sixteen years a process of educational development that in general took much longer elsewhere. This process would involve substantial increases in the volume of educational expenditures. As shown in Table 25, educational cost¹ would increase from about \$2.9 billion in

1964 to \$9.4 billion by 1980, representing an average annual rate of increase of 7.5 per cent. Such data as are

1. For the purpose of the following analysis, estimates of costs based on unit costs have been taken for expenditure. As explained above, actual expenditure may in certain circumstances be higher or lower.

TABLE 25 (cont.)

Level and type of education	1964 (base year)					1970				
	Recurring cost \$	Stipends \$	Total recurring cost \$	Capital cost \$	Total cost \$	Recurring cost \$	Stipends \$	Total recurring cost \$	Capital cost \$	Total cost \$
GROUP B										
FIRST LEVEL (I-VII)	661 812	.	661 812	255 490	917 302	1 067 080	.	1 067 080	410 281	1 477 361
SECOND LEVEL (VIII-XII)										
Lower stage (VIII-X)										
General	234 385	.	234 385			383 671	.	383 671		
Vocational	82 886	.	82 886			179 420	.	179 420		
Total (VIII-X)	317 271	.	317 271	130 271	447 488	563 091	.	563 091	280 344	843 435
Upper stage (XI-XII)										
General	60 635	.	60 635			105 793	.	105 793		
Technical and vocational	70 680	.	70 680			148 774	.	148 774		
Teacher training ¹	31 251	20 206	51 457			37 594	32 760	70 354		
In-service training for primary school teachers	—	.	—			13 132	.	13 132		
Total (XI-XII)	162 566	20 206	182 772	91 457	274 229	305 293	32 760	338 053	117 051	455 104
Total second level (VIII-XII)	479 837	20 206	500 043	221 674	721 717	868 384	32 760	901 144	397 395	1 298 539
THIRD LEVEL (XIII +)										
Science and technological (XIII +) and technical course (XIII-XIV)	187 585	.	187 585	98 771	286 356	370 985	.	370 985	239 017	610 002
Arts and other (XIII +) and teacher training (XIII-XIV)	99 326	.	99 326	45 494	144 820	183 431	.	183 431	63 413	246 844
In-service training for second level teachers	—	.	—		—	5 743	.	5 743		5 743
Total third level (XIII +)	286 911	.	286 911	144 265	431 176	560 159	.	560 159	302 430	862 589
TOTAL (ALL LEVELS)	1 428 560	20 206	1 448 766	621 429	2 070 195	2 495 623	32 760	2 528 383	1 110 106	3 638 489
Administrative	1 429	.	1 429		1 429	2 496	.	2 496		2 496
Student residences	.	.	.	16 184	16 184	.	.	.	30 465	30 465
Total	1 429 989	20 206	1 450 195	637 613	2 087 808	2 498 119	32 760	2 530 879	1 140 571	3 671 450

available indicate that between 1950 and 1960 educational expenditure increased at an average annual rate of about 12 per cent.¹

The question arises as to whether such rise in expenditure is feasible. The process of development implies

1. The estimates of the growth rate of educational expenditure for the periods 1950 to 1960 and 1964 to 1980 are not comparable in view of the fact that the former are based on current prices whereas the latter are estimated on the basis of constant prices. The annual growth rate of educational expenditure between 1950 and 1960 should be adjusted downward in order to make allowance for an increase in the price level during the period.

1975					1980				
Recurring cost \$	Stipends \$	Total recurring cost \$	Capital cost \$	Total cost \$	Recurring cost \$	Stipends \$	Total recurring cost \$	Capital cost \$	Total cost \$
1 544 600	.	1 544 600	494 785	2 039 385	2 217 760	.	2 217 760	372 151	2 589 911
564 337	.	564 337			921 064	.	921 064		
323 997	.	323 997			513 408	.	513 408		
888 334	.	888 334	372 492	1 260 826	1 434 472	.	1 434 472	476 906	1 911 378
161 891	.	161 891			239 544	.	239 544		
249 871	.	249 871			346 033	.	346 033		
28 464	40 871	69 335			17 974	39 853	57 827		
16 838	.	16 838			19 012	.	19 012		
457 064	40 871	497 935	117 827	615 762	622 563	39 853	662 416	193 916	856 332
1 345 398	40 871	1 386 269	490 319	1 876 588	2 057 035	39 853	2 096 888	670 822	2 767 710
628 797	.	628 797	281 781	910 578	908 904	.	908 904	307 407	1 216 311
267 489	.	267 489	59 671	327 160	329 581	.	329 581	56 014	385 595
8 107	.	8 107		8 107	10 820	.	10 820		10 820
904 393	.	904 393	341 452	1 245 845	1 249 305	.	1 249 305	363 421	1 612 726
3 794 391	40 871	3 835 262	1 326 556	5 161 818	5 524 100	39 853	5 563 953	1 406 394	6 970 347
3 794	.	3 794		3 794	5 524	.	5 524		5 524
	.		64 434	64 434		.		83 256	83 256
3 798 185	40 871	3 839 056	1 390 990	5 230 046	5 524 100	39 853	5 569 477	1 489 650	7 059 127

growth of output and widening of the resource base. The very resources needed in development thus continue to be enlarged as development proceeds.

Over the last fifteen years, the GNP of the region has grown at about 4 per cent per year, so that output in real

terms is now approximately 80 per cent higher than in 1950. This growth rate has come to be regarded as not satisfactory, and there are mounting pressures everywhere to accelerate the tempo. These pressures found powerful expression in the United Nations General Assembly

TABLE 25. (cont.)

Level and type of education	1964 (base year)					1970				
	Recurring cost \$	Stipends \$	Total recurring cost \$	Capital cost \$	Total cost \$	Recurring cost \$	Stipends \$	Total recurring cost \$	Capital cost \$	Total cost \$
GROUP C										
FIRST LEVEL (I-VII)	393 308	.	393 308	50 236	443 544	540 204	.	540 204	85 824	626 028
SECOND LEVEL (VIII-XII)										
Lower stage (VIII-X)										
General	84 998	.	84 998			132 030	.	132 030		
Vocational	10 816	.	10 816			41 885	.	41 885		
Total	95 814	.	95 814	33 762	129 576	173 915	.	173 915	75 673	249 588
Upper stage (XI-XII)										
General	22 588	.	22 588			32 974	.	32 974		
Technical and vocational	46 307	.	46 307			57 484	.	57 484		
Teacher training ¹	7 555	7 355	14 910			5 235	6 966	12 201		
In-service training for primary school teachers	—	.	—		—	3 775	.	3 775		
Total (XI-XII)	76 450	7 355	83 805	1 267	85 072	99 468	6 966	106 434	28 196	134 630
Total second level (VIII-XII)	172 264	7 355	179 619	35 029	214 648	273 383	6 966	280 349	103 869	384 218
THIRD LEVEL (XIII +)										
Science and technological (XIII +) and technical course (XIII-XIV)	55 170	.	55 170	56 476	111 646	104 566	.	104 566	50 465	155 031
Arts and other (XIII +) and teacher training (XIII-XIV)	44 632	.	44 632	27 380	72 012	58 254	.	58 254	1 680	59 934
In-service training for second level teachers	—	.	—		—	1 557	.	1 557		1 557
Total third level (XIII +)	99 802	.	99 802	83 856	183 658	164 377	.	164 377	52 145	216 522
TOTAL (ALL LEVELS)	665 374	7 355	672 729	169 121	841 850	977 964	6 966	984 930	241 838	1 226 768
Administrative	665	.	655		665	978	.	978		978
Student residences	.	.	.	7 812	7 812	.	.	.	1 744	1 744
Total	666 039	7 355	673 394	176 933	850 327	978 942	6 966	985 908	243 572	1 229 490

Resolution 1710 (XVI) designating the current decade as the United Nations Development Decade and calling upon Member States to intensify efforts 'to accelerate progress... taking as the objective a minimum annual rate of growth of aggregate national income of 5 per cent

at the end of the Decade'. The second Conference of Heads of States and Governments of the non-aligned countries, held in Cairo in October 1964 and representing a large majority of the developing countries, recommended in a formal resolution 'that the target of economic growth

1975					1980				
Recurring cost \$	Stipends \$	Total recurring cost \$	Capital cost \$	Total cost \$	Recurring cost \$	Stipends \$	Total recurring cost \$	Capital cost \$	Total cost \$
699 495	.	699 495	105 266	804 761	885 025	.	885 025	110 767	995 792
185 451	.	185 451			297 615	.	297 615		
97 859	.	97 859			131 718	.	131 718		
283 310	.	283 310	95 255	378 565	429 333	.	429 333	131 537	560 870
51 229	.	51 229			69 585	.	69 585		
86 127	.	86 127			114 728	.	114 728		
2 809	6 247	9 056			3 144	11 057	14 201		
4 508	.	4 508			4 832	.	4 832		
144 673	6 247	150 920	21 135	172 055	192 289	11 057	203 346	64 410	267 756
427 983	6 247	434 230	116 390	550 620	621 622	11 057	632 679	195 947	828 626
180 959	.	180 959	91 817	272 776	80 838	.	80 838	11 102	91 940
65 115	.	65 115	7 990	73 105	245 949	.	245 949	34 230	280 179
2 296	.	2 296		2 296	3 180	.	3 180		3 180
248 370	.	248 370	99 807	348 177	329 967	.	329 967	45 332	375 299
1 375 848	6 247	1 382 095	321 463	1 703 558	1 836 614	11 057	1 847 671	352 046	2 199 717
1 376	.	1 376		1 376	1 837	.	1 837		1 837
1 377 224	6 247	1 383 471	11 501	11 501	1 838 451	11 057	1 849 508	10 247	10 247
			332 964	1 716 435				362 293	2 211 801

set for the Development Decade by the United Nations should be raised'.

The countries of the region have in fact set even more ambitious targets. Nearly everywhere in the region, planning commissions or agencies have been established.

They have outlined development objectives, suggested allocation of resources and indicated the policies that need to be changed in order to surmount the obstacles. There are often shortages, reflecting inadequate implementation or delay in policy changes. But experience is

TABLE 25 (cont.)

Level and type of education	1964 (base year)					1970				
	Recurring cost \$	Stipends \$	Total recurring cost \$	Capital cost \$	Total cost \$	Recurring cost \$	Stipends \$	Total recurring cost \$	Capital cost \$	Total cost \$
THE REGION										
FIRST LEVEL (I-VII)	1 061 803	.	1 061 803	309 131	1 370 934	1 619 670	.	1 619 670	503 225	2 122 895
SECOND LEVEL (VIII-XII)										
Lower stage (VIII-X)										
General	320 465	.	320 465			518 747	.	518 747		
Vocational	94 340	.	94 340			222 814	.	222 814		
Total	414 805	.	414 805	165 966	580 771	741 561	.	741 561	359 499	1 101 060
Upper stage (XI-XII)										
General	83 445	.	83 445			139 418	.	139 418		
Technical and vocational	117 150	.	117 150			206 896	.	206 896		
Teacher training ¹	39 019	27 662	66 681			43 287	40 046	83 333		
In-service training for primary school teachers	—	.	—	.	—	17 039	.	17 039		
Total (XI-XII)	239 614	27 662	267 276	92 863	360 139	406 640	40 046	446 686	146 398	593 084
Total second level (VIII-XII)	654 419	27 662	682 081	258 829	940 910	1 148 201	40 046	1 188 247	505 897	1 694 144
THIRD LEVEL (XIII +)										
Science and technological (XIII +) and technical course (XIII-XIV)	243 355	.	243 355	155 417	398 772	476 769	.	476 769	292 751	769 520
Arts and other (XIII +) and teacher training (XIII-XIV)	144 408	.	144 408	73 254	217 662	242 448	.	242 448	65 974	308 422
In-service training for second level teachers	—	.	—	.	—	7 351	.	7 351	.	7 351
Total third level (XIII +)	387 763	.	387 763	228 671	616 434	726 568	.	726 568	358 725	1 085 293
TOTAL (ALL LEVELS)	2 103 985	27 662	2 131 647	796 631	2 928 278	3 494 439	40 046	3 534 485	1 367 847	4 902 332
Administrative	2 104	.	2 104	.	2 104	3 495	.	3 495	.	3 495
Student residences	.	.	.	24 148	24 148	.	.	.	32 781	32 781
Total	2 106 089	27 662	2 133 751	820 779	2 954 530	3 497 934	40 046	3 537 980	1 400 628	4 938 608

1. Includes teacher-training continuation course (Grade XIII).

being gained. If the current national development plans are aggregated, they indicate an over-all target of 6.4 per cent annual growth.

These considerations form the background to the future levels of economic development in the region. For

convenience of presentation, estimates of the possible growth of these economies have been based on three hypotheses: (a) a low estimate of an annual growth rate of 4 per cent which represents a continuation of the past trends; (b) a medium estimate of 5 per cent which

1975					1980				
Recurring cost \$	Stipends \$	Total recurring cost \$	Capital cost \$	Total cost \$	Recurring cost \$	Stipends \$	Total recurring cost \$	Capital cost \$	Total cost \$
2 264 770	.	2 264 770	609 397	2 874 167	3 136 301	.	3 136 301	494 668	3 630 969
755 547	.	755 547			1 228 615	.	1 228 615		
424 229	.	424 229			648 542	.	648 542		
1 179 776	.	1 179 776	472 376	1 652 152	1 877 157	.	1 877 157	615 154	2 492 311
214 507	.	214 507			311 725	.	311 725		
337 855	.	337 855			464 572	.	464 572		
31 907	47 905	79 812			22 052	52 857	74 909		
21 541	.	21 541			24 091	.	24 091		
605 810	47 905	653 715	141 344	795 059	822 440	52 857	875 297	262 157	1 137 454
1 785 586	47 905	1 833 491	613 720	2 447 211	2 699 597	52 857	2 752 454	877 311	3 629 765
814 728	.	814 728	378 156	1 192 884	1 164 132	.	1 164 132	347 363	1 511 495
334 524	.	334 524	68 730	403 254	414 231	.	414 231	68 903	483 134
10 489	.	10 489		10 489	14 130	.	14 130		14 130
1 159 741	.	1 159 741	446 886	1 606 627	1 592 493	.	1 592 493	416 266	2 008 759
5 210 097	47 905	5 258 002	1 670 003	6 928 005	7 428 391	52 857	7 481 248	1 788 245	9 269 493
5 210	.	5 210		5 210	7 429	.	7 429		7 429
5 215 307	47 905	5 263 212	1 747 218	7 010 430	7 435 820	52 857	7 488 677	1 884 328	9 373 005

corresponds to the minimum objectives of the Development Decade; and (c) a relatively high estimate of 6 per cent, which is somewhat lower than the combined objectives in the current national development plans or what some of the countries in the region have currently achieved.

The results shown in Table 26 are intended only to indicate what GNP could be, should any of the assumed growth rates be achieved. This will provide a frame of reference against which the feasibility or otherwise of the targets of the Asian Model may be assessed.

TABLE 26. Cost of education in relation to GNP, 1964, 1970, 1975 and 1980

	Cost as per cent of GNP			
	1964	1970	1975	1980
GROUP A				
GNP annual growth at 4%	0.93	1.70	2.37	3.11
GNP annual growth at 5%	0.89	1.54	2.05	2.56
GNP annual growth at 6%	0.86	1.40	1.78	2.12
GROUP B				
GNP annual growth at 4%	3.43	4.76	5.57	6.18
GNP annual growth at 5%	3.30	4.33	4.83	5.11
GNP annual growth at 6%	3.17	3.93	4.19	4.22
GROUP C				
GNP annual growth at 4%	4.65	5.32	6.11	6.47
GNP annual growth at 5%	4.48	4.84	5.29	5.34
GNP annual growth at 6%	4.31	4.40	4.59	4.42
THE REGION				
GNP annual growth at 4%	3.65	4.81	5.63	6.18
GNP annual growth at 5%	3.51	4.38	4.87	5.10
GNP annual growth at 6%	3.38	3.98	4.23	4.22

Note. From 1960 GNP figures obtained from ECAFE, three alternative growth hypotheses were used: an average annual 4%, 5% and 6% rate of growth.

Since the average annual growth rate of educational expenditure is higher than that assumed for over-all economic growth, it is obvious that the share of educational expenditure in national output will continue to rise. In this sense, it represents a continuation of the past trend in the region which has shown, between 1950 and 1960, an annual growth of educational expenditure nearly three times the annual growth rate of GNP. Assuming a low annual growth of GNP of only 4 per cent, the share of educational expenditure in Group A would be 3.11 per cent of its GNP in 1980. On the other hand, if the higher assumption of the growth rate of GNP (6 per cent per year) were to be attained, the share of educational expenditure would be 2.12 per cent. For Group B the comparable figures are 6.18 per cent and 4.22 per cent and in Group C they are 6.47 per cent and 4.42 per cent. For the region, educational expenditure

would be 6.18 of GNP in 1980 if GNP increased at an annual rate of 4 per cent and 4.22 per cent if GNP increased 6 per cent annually until 1980.

Budgetary implications (Table 27)

In an attempt to analyse the budgetary implications of educational development, i.e., to analyse public expenditure on school education in relation to estimated public revenue, it is necessary to translate total costs of school education in terms of estimated public expenditure on school education.¹ Policies concerning private education differ considerably from one country to another in the region. Available data indicate that at present, public expenditure constitutes approximately 80 per cent of total expenditures on school education in Group A, about 72 per cent in Group B and 75 per cent in Group C. With the extension of free and compulsory education, it seems reasonable to expect that the share of public expenditure would gradually increase. It has been assumed here that the share of public expenditure will increase to 83 per cent in Group A, to 78 per cent in Group B and to 80 per cent in Group C.

Public revenues have been calculated on the basis of GNP estimates. Available information indicates that at present, public revenues represent about 7 per cent of GNP in Group A, 17 per cent in Group B and 20 per cent in Group C. With the economic development of the countries in the region, it may be assumed that the share of public revenue in GNP will increase. For the calculation of public revenue in the period till 1980, two hypotheses concerning the share of public revenue were used: Hypothesis I (low increase in the share) and Hypothesis II (high increase in the share).

According to Hypothesis I it was assumed that by 1980 public revenues as a share of the GNP would be 15 per cent in Group A, 24 per cent in Group B and 25 per cent in Group C and according to Hypothesis II the 1980 share would be 20 per cent in Group A, 28 per cent in Group B and 30 per cent in Group C.²

On the basis of these assumptions, estimated public expenditures on school education have been related to

1. In analysing the estimates of public expenditure on school education attention is invited to what has been said in the first paragraph of this section about the concept of costs as used in this Model and also about the distinction between costs and expenditure. The term 'public expenditure on school education' used here actually represents the share of the public sector in financing the costs of school education as defined above.
2. A fuller description of the assumptions used for estimating public expenditure on school education and public revenue for 1964, 1970, 1975 and 1980 for all the groups is given in Appendix F.

TABLE 27. Estimated public expenditure on education in relation to estimated public revenue, 1964, 1970, 1975 and 1980

	Public expenditure as per cent of public revenue			
	1964	1970	1975	1980
PUBLIC REVENUE HYPOTHESIS I (LOW)				
<i>Group A</i>				
GNP annual growth at 4%	10.63	13.74	15.53	17.19
GNP annual growth at 5%	10.23	12.49	13.45	14.20
GNP annual growth at 6%	9.84	11.36	11.67	11.74
<i>Group B</i>				
GNP annual growth at 4%	14.51	18.54	20.17	20.11
GNP annual growth at 5%	13.96	16.85	17.48	16.60
GNP annual growth at 6%	13.44	15.33	15.16	13.73
<i>Group C</i>				
GNP annual growth at 4%	17.44	18.63	20.54	20.70
GNP annual growth at 5%	16.78	16.93	17.79	17.10
GNP annual growth at 6%	16.16	15.40	15.43	14.15
<i>The region</i>				
GNP annual growth at 4%	15.23	18.51	20.20	20.21
GNP annual growth at 5%	14.66	16.82	17.50	16.68
GNP annual growth at 6%	14.11	15.30	15.18	13.80
PUBLIC REVENUE HYPOTHESIS II (HIGH)				
<i>Group A</i>				
GNP annual growth at 4%	10.63	11.44	12.13	12.89
GNP annual growth at 5%	10.23	10.41	10.51	10.64
GNP annual growth at 6%	9.84	9.63	9.11	8.81
<i>Group B</i>				
GNP annual growth at 4%	14.51	16.78	17.65	17.23
GNP annual growth at 5%	13.96	15.24	15.29	14.23
GNP annual growth at 6%	13.44	13.87	13.26	11.77
<i>Group C</i>				
GNP annual growth at 4%	17.44	17.08	17.88	17.26
GNP annual growth at 5%	16.78	15.52	15.49	14.25
GNP annual growth at 6%	16.16	14.12	13.43	11.79
<i>The region</i>				
GNP annual growth at 4%	15.23	16.79	17.63	17.17
GNP annual growth at 5%	14.66	15.26	15.27	14.18
GNP annual growth at 6%	14.11	13.88	13.25	11.73

See note, Table 26.

estimated public revenues. The results, as shown in Table 27, indicate that even with the low hypothesis concerning public revenues, the percentage of public revenues to be spent on school education remains within reasonable limits.

The distribution of recurring cost in 1964 and 1980 by levels of education is shown below for the whole region. It will be observed that between 1964 and 1980, of all recurring costs for school education, the share devoted to the second level increases most significantly. The share for the third level also shows an important increase.

	1964 %	1980 %
First level	50	42
Second level	32	37
Third level	18	21
	100	100

Educational output and manpower supply

The following paragraphs present estimates of the 'educational output' in terms of certain broad categories of higher level personnel resulting from the expansion and diversification of the educational system envisaged in the Model.

For this purpose the output of the school system is identified according to two categories: those who completed Grades XII to XV and those who completed Grades XVI and over. Those who completed Grades XII to XV are further differentiated by type of education, 'General', 'Technical', 'Teacher training'. Those who completed Grades XVI and over are divided into 'Science and other' and 'Arts and other'¹.

Tables 28 and 29 present educational output according to these categories. Net output are those surviving to 1970, 1975 and 1980 from the gross output which are the numbers leaving the system during the periods 1964-70, 1971-75 and 1976-80. Appendix E describes the age patterns and survival rates used.

1. 'General' includes output from general, Grade XII and from arts, humanities, social sciences, etc., Grades XIII, XIV and XV.
'Technical' includes output from technical, Grades XII, XIII and XIV and science, science-based and technological, Grades XIII, XIV and XV.
'Teacher training' includes output from teacher training XII and the continuation course, Grade XIII and teacher training, Grades XIII and XIV.
'Science and other' includes output from science, science-based and technological, Grades XVI and over.
'Arts and other' includes output from arts, humanities, social sciences, etc., Grades XVI and over.

TABLE 28. Cumulative educational output by type and grade of school completed in 1970, 1975 and 1980 (in thousands)

	Educational output by type and grade of school completed						
	Grades XII-XV				Grades XVI +		
	General	Technical	Teacher training	Total	Science and other	Arts and other	Total
GROUP A							
Gross output							
From 1964-70	10.6	5.9	15.9	32.4	3.3	5.0	8.3
From 1971-75	22.7	28.5	19.8	71.0	5.6	6.9	12.5
From 1976-80	41.6	80.0	31.7	153.3	14.3	14.5	28.8
Net output available							
In 1970							
From 1964-70	10.4	5.8	15.6	31.8	3.2	4.9	8.1
In 1975							
From 1964-70	10.1	5.6	15.2	30.9	3.1	4.7	7.8
From 1971-75	22.5	28.2	19.6	70.3	5.5	6.8	12.3
Total	32.6	33.8	34.8	101.2	8.6	11.5	20.1
In 1980							
From 1964-70	9.8	5.4	14.7	29.9	3.0	4.6	7.6
From 1971-75	21.8	27.3	19.0	68.1	5.4	6.6	12.0
From 1976-80	41.2	79.2	31.4	151.8	14.1	14.3	28.4
Total	72.8	111.9	65.1	249.8	22.5	25.5	48.0
GROUP B							
Gross output							
From 1964-70	2 476.9	2 479.3	1 648.9	6 605.1	1 126.7	1 298.3	2 425.0
From 1971-75	3 334.3	4 196.7	1 169.4	8 700.4	1 366.9	1 422.1	2 789.0
From 1976-80	5 167.4	6 980.2	1 042.0	13 189.6	1 938.2	1 883.9	3 822.1
Net output available							
In 1970							
From 1964	2 436.3	2 438.6	1 621.8	6 496.7	1 150.6	1 274.0	2 379.6
In 1975							
From 1964-70	2 360.7	2 363.0	1 571.6	6 295.3	1 070.2	1 233.2	2 303.4
From 1971-75	3 299.6	4 153.0	1 157.2	8 609.8	1 350.0	1 404.5	2 754.5
Total	5 660.3	6 516.0	2 728.8	14 905.1	2 420.2	2 637.7	5 057.9
In 1980							
From 1964-70	2 284.2	2 286.4	1 520.6	6 091.2	1 033.5	1 190.9	2 224.4
From 1971-75	3 198.9	4 026.3	1 121.9	8 347.1	1 307.2	1 360.0	2 667.2
From 1976-80	5 113.6	6 907.6	1 031.2	13 052.4	1 914.4	1 860.7	3 775.1
Total	10 596.7	13 220.3	3 673.7	27 490.7	4 255.1	4 411.6	8 666.7

In analysing Tables 28 and 29 it should be noted that 'Teacher training' only includes the greater part of teachers destined for primary schools while all teachers for second and third level institutions as well as an increasing proportion of teachers for primary schools come from Grades XVI and over. The striking increase in the output from 'Technical' is the cumulative result of two objectives: to both increase and up-grade middle

level technical manpower. The output therefore reflects an increasing proportion of enrolment in technical Grade XII as well as an increasing proportion of technical education in Grades XIII and XIV to fill the gap in intermediate technical manpower and improve the ratio of technicians to technologists. This ratio is at present too low, thus retarding the full utilization of high level (XVI+) scientists and technologists.

	Educational output by type and grade of school completed						
	Grades XII-XV				Grades XVI +		
	General	Technical	Teacher training	Total	Science and other	Arts and other	Total
GROUP C							
Gross output							
From 1964-70	872.8	1 018.9	339.3	2 231.0	338.3	485.9	714.2
From 1971-75	1 053.9	1 274.6	216.7	2 545.2	368.0	339.3	707.3
From 1976-80	1 448.8	1 707.5	186.1	3 342.4	548.0	374.0	922.0
Net output available							
In 1970							
From 1964-70	858.5	1 002.2	333.7	2 194.4	332.0	476.8	808.8
In 1975							
From 1964-70	831.9	971.1	323.4	2 126.4	321.4	461.6	783.0
From 1971-75	1 042.9	1 261.3	214.4	2 518.6	363.4	335.1	698.5
Total	1 874.8	2 232.4	537.8	4 645.0	684.8	796.7	1 481.5
In 1980							
From 1964-70	804.9	939.6	312.9	2 057.4	310.3	445.7	756.0
From 1971-75	1 011.1	1 222.8	207.9	2 441.8	351.9	324.5	676.4
From 1976-80	1 433.7	1 689.7	184.2	3 307.6	541.2	369.4	910.6
Total	3 249.7	3 852.1	705.0	7 806.8	1 203.4	1 139.6	2 343.0
THE REGION							
Gross output							
From 1964-70	3 360.3	3 504.1	2 004.1	8 868.5	1 468.3	1 789.2	3 257.5
From 1971-75	4 410.9	5 499.8	1 405.9	11 316.6	1 740.5	1 768.3	3 508.8
From 1976-80	6 657.8	8 767.7	1 259.8	16 685.3	2 500.5	2 272.4	4 772.9
Net output available							
In 1970							
From 1964	3 305.2	3 446.6	1 971.1	8 722.9	1 485.8	1 755.7	3 241.5
In 1975							
From 1964-70	3 202.7	3 339.7	1 910.2	8 452.6	1 394.7	1 699.5	3 094.2
From 1971-75	4 365.0	5 442.5	1 391.2	11 198.7	1 718.9	1 746.4	3 465.3
Total	7 567.7	8 782.2	3 301.4	19 651.3	3 113.6	3 445.9	6 559.5
In 1980							
From 1964-70	3 098.9	3 231.4	1 848.2	8 178.5	1 346.8	1 641.2	2 988.0
From 1971-75	4 231.8	5 276.4	1 348.8	10 857.0	1 664.5	1 691.1	3 355.6
From 1976-80	6 588.5	8 676.5	1 246.8	16 511.8	2 469.7	2 244.4	4 714.1
Total	13 919.2	17 184.3	4 443.8	35 547.3	5 481.0	5 576.7	11 057.7

An estimate of the 1964 labour force in the region by major occupational groups and by educational attainment is shown in Table 30. Data concerning the present labour force by educational attainment are, in many cases, inadequate and Table 30, therefore, is but an estimation based upon a variety of sources of varying reliability and comparability.

Tables 31 and 32 show the changes in the educational attainment of the labour force resulting from the output from the school system during the period 1964-80.

It may be noted that for the region as a whole, the

output of the school system (XII+) from 1964-70 which will be in the labour force in 1970 will represent 65 per cent of the labour force with twelve or more years of education in 1970. The output from 1964-75 will constitute 82 per cent of the labour force with twelve or more years of education in 1975, while the output from 1964-80 will represent 89 per cent of the labour force with twelve or more years of education in 1980.

It is not feasible to establish strict comparisons with other countries but the following available data on the percentage distribution of the labour force by educational

Figure 3. Cumulative educational output by grade of school completed, 1964-70, 1971-75 and 1976-80.

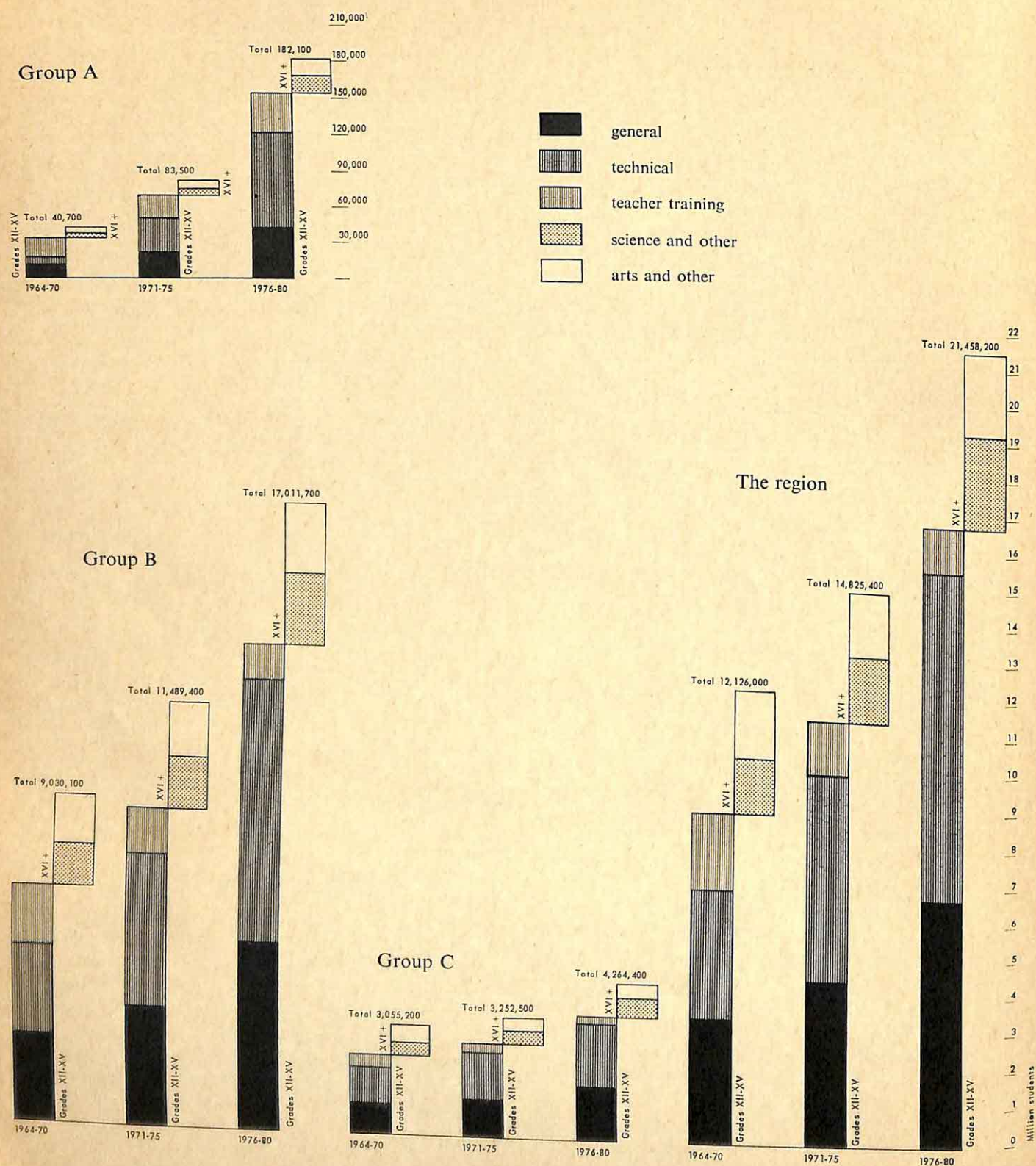


TABLE 29. Trends in net cumulative output, by type and grade of school completed in 1970, 1975 and 1980

Net educational output by type, Grades XII + (in percentage)									
	Grades XII-XV			Grades XVI +		Total of Grades			Total Grades XII + ('000)
	General	Technical	Teacher training	Science and other	Arts and other	XII +	XII-XV	XVI +	
GROUP A									
Net cumulative output in									
1970 (from 1964-70)	26	15	39	8	12	100	80	20	39.9
1975 (from 1964-75)	27	28	29	7	9	100	84	16	121.3
1980 (from 1964-80)	24	37	22	8	9	100	83	17	297.8
GROUP B									
Net cumulative output in									
1970 (from 1964-70)	27	28	18	13	14	100	73	27	8 876.3
1975 (from 1964-75)	28	33	14	12	13	100	75	25	19 963.0
1980 (from 1964-80)	29	37	10	12	12	100	76	24	36 157.4
GROUP C									
Net cumulative output in									
1970 (from 1964-70)	29	34	11	11	16	100	73	27	3 003.2
1975 (from 1964-75)	31	36	9	11	13	100	76	24	6 126.5
1980 (from 1964-80)	32	38	7	12	11	100	77	23	10 149.8
THE REGION									
Net cumulative output in									
1970 (from 1964-70)	28	29	16	12	15	100	73	27	11 919.4
1975 (from 1964-75)	29	33	13	12	13	100	75	25	26 210.8
1980 (from 1964-80)	30	37	9	12	12	100	76	24	46 605.0

attainment in certain countries for various years may be of interest.¹

Years of education	Per cent of labour force by years of schooling completed					
	Italy 1951	England and Wales 1951	Japan 1959	U.S.A. 1950	France 1954	Canada 1951
12 or more	6	7	24	39	...	...
13 or more	...	...	...	15	5	10
16 or more	2	...	6	7	...	...

Further information of a similar nature related to the historical experience of some countries indicates: in France in 1880 the labour force with 16 years or more of education constituted 0.4 per cent of the labour force and in 1920 this proportion was 1.2 per cent; in the U.S.A. the proportion with 16 years or more of education was

1-1.5 per cent in 1890, 2-2.5 per cent in 1910 and 3-3.5 per cent in 1920; in the U.S.S.R. the proportions were 0.06 per cent in 1897, 0.3 per cent in 1926, 0.9 per cent in 1939, 1.5 per cent in 1950 and 2.4 per cent in 1959.²

Considering the rising needs of Asian countries the proposed targets do not seem ambitious, and would seem to be sufficient to meet their requirements for development. It would be desirable to assess these needs with more precision and it is recommended that Member States give particular attention to developing manpower studies and relating them to education with regard both to the present situation and the future prospects.

It is not feasible to relate the educational output in detail to manpower requirements for the whole region in

1. *Forecasting Educational Needs for Economic and Social Development*, H.S. Parres, OECD, Paris, 1962, pp. 108-110.
2. *IIEP/INF/66-3 Draft*, International Institute for Educational Planning, Paris, 1966, pp. 13-15.

TABLE 30. Labour force by major occupational groups and by educational attainment, 1964

	Group A	Group B	Group C	The region
Population ('000)	25 581.0	762 424.0	125 168.0	913 173.0
Labour force ('000)	9 944.0	303 390.0	47 959.0	361 293.0
As proportion of population	38.9%	39.8%	38.3%	39.6%
<i>Labour force by major occupational categories</i>				
Professional, technical and related workers ('000)	60.0	5 461.0	1 247.0	6 768.0
As proportion of labour force	0.6%	1.8%	2.6%	1.9%
Administrative, executive and managerial workers ('000)	40.0	4 247.0	1 007.0	5 294.0
As proportion of labour force	0.4%	1.4%	2.1%	1.5%
<i>Labour force by educational attainment</i>				
Completed Grades XII-XV ('000)	20.0	3 034.0	767.0	3 821.0
As proportion of labour force	0.2%	1.0%	1.6%	1.1%
Completed Grades XVI + ('000)	10.0	1 820.0	432.0	2 262.0
As proportion of labour force	0.1%	0.6%	0.9%	0.6%

Source. National Statistics. Labour force data have been extrapolated to 1964 on the basis of the latest information available. Data on the distribution of labour force by major occupational categories and by educational attainment are estimates based on the latest national data available.

view of the paucity of essential data required for the purpose. The broad pattern of needs as they are likely to emerge can, however, be identified:

1. Economic progress should increase substantially the demand for skilled manpower as a result of: (a) the shift from agriculture towards sectors requiring a higher level of qualification; (b) the increasing proportion of skilled occupations within each broad sector, and (c) for each specific occupation, the rising level of educational qualification required.
2. In most Asian countries there is a critical shortage of skilled manpower. In some countries and in some sectors, however, a situation of surplus may be found, resulting from an imbalance in education. Persons with 'technician' level of training are not adequate in relation to those who acquire university level qualifications. Similarly, graduates from arts faculties and

TABLE 32. Labour force by educational attainment, 1964, 1970, 1975 and 1980

	1964	1970	1975	1980
GROUP A				
Total labour force ('000)	9 944	11 072	12 278	13 995
Proportion who completed				
Grades XII-XV	0.20%	0.43%	0.88%	1.72%
Grades XVI +	0.10%	0.15%	0.22%	0.37%
Total, Grades XII +	0.30%	0.58%	1.10%	2.09%
GROUP B				
Total labour force ('000)	303 390	352 424	399 422	448 670
Proportion who completed				
Grades XII-XV	1.00%	2.47%	4.03%	6.07%
Grades XVI +	0.60%	1.10%	1.54%	2.07%
Total, Grades XII +	1.60%	3.57%	5.57%	8.14%
GROUP C				
Total labour force ('000)	47 959	57 622	67 416	79 286
Proportion who completed				
Grades XII-XV	1.60%	4.67%	7.20%	9.65%
Grades XVI +	0.90%	1.97%	2.54%	3.10%
Total, Grades XII +	2.50%	6.64%	9.74%	12.75%
THE REGION				
Total labour force ('000)	361 293	421 118	479 116	541 911
Proportion who completed				
Grades XII-XV	1.10%	2.71%	4.39%	6.48%
Grades XVI +	0.60%	1.20%	1.65%	2.18%
Total, Grades XII +	1.70%	3.91%	6.04%	8.66%

Note. Total labour force was obtained by applying the 1964 labour force participation rates for each group as shown in Table 30.

secondary school leavers with academic education outnumber graduates or specialists in science and technology.

3. Technicians constitute a strategic group in developing countries; they will be required not only for industrialization (in Group B and even more in Group C), but also for agriculture which, despite the shift towards the other sectors which will reduce its relative share in national product would employ an increasing number of high level manpower in all countries.
4. For the tertiary sector (which is likely to develop more in Group C) a wide range of specialists would be required, such as business managers, trained clerks, book-keepers, secretaries, etc. Qualified administrators constitute a key category of personnel, particularly at the first stages of development and in countries of Group A which still have to establish and reinforce their administrative structure.

TABLE 31. Labour force by type and grade of school completed, 1964, 1970, 1975 and 1980 (in thousands)

	Labour force by type and grade of school completed						
	Grades XII-XV				Grades XVI +		
	General	Technical	Teacher training	Total	Science and other	Arts and other	Total
GROUP A							
In 1964	...	...	...	20.0	...	...	10.0
In 1970	...	...	...	18.8	...	...	9.3
From 1964 stock	...	...	...	28.6	4.4	2.9	7.3
From 1964-70 output	9.4	5.2	14.0	47.4	...	...	16.6
Total	...	...	...	...	...	...	...
In 1975	...	...	...	17.6	...	...	8.8
From 1964 stock	...	...	...	27.8	4.2	2.8	7.0
From 1964-70 output	9.1	5.0	13.7	63.2	6.1	5.0	11.1
From 1971-75 output	20.2	25.4	17.6	108.6	...	...	26.9
Total	...	...	...	...	...	...	...
In 1980	...	...	...	16.3	...	...	8.2
From 1964 stock	...	...	...	26.9	4.1	2.7	6.8
From 1964-70 output	8.8	4.9	13.2	61.3	5.9	4.9	10.8
From 1971-75 output	19.6	24.6	17.1	136.7	12.9	12.7	25.6
From 1976-80 output	37.1	71.3	28.3	241.2	...	...	51.4
Total	...	...	...	...	...	...	...
GROUP B							
In 1964	...	...	...	3 034.0	...	...	1 820.0
In 1970	...	...	...	2 844.0	...	...	1 706.1
From 1964 stock	...	...	...	5 847.0	1 146.6	1 035.5	2 182.1
From 1964-70 output	2 192.7	2 194.7	1 459.6	8 691.0	...	...	3 888.2
Total	...	...	...	...	...	...	...
In 1975	...	...	...	2 669.6	...	...	1 601.4
From 1964 stock	...	...	...	5 665.7	1 109.9	963.2	2 073.1
From 1964-70 output	2 124.6	2 126.7	1 414.4	7 748.8	1 264.0	1 215.0	2 479.0
From 1971-75 output	2 969.6	3 737.7	1 041.5	16 084.1	...	...	6 153.5
Total	...	...	...	...	...	...	...
In 1980	...	...	...	2 478.1	...	...	1 486.5
From 1964 stock	...	...	...	5 482.1	1 071.8	930.2	2 002.0
From 1964-70 output	2 055.8	2 057.8	1 368.5	7 512.4	1 224.0	1 176.5	2 400.5
From 1971-75 output	2 879.0	3 623.7	1 009.7	11 747.1	1 674.6	1 723.0	3 397.6
From 1976-80 output	4 602.2	6 216.8	928.1	27 219.7	...	...	9 286.6
Total	...	...	...	...	...	...	...

5. It is desirable to give particular attention to the qualitative aspects of technical and vocational education and training, and to ensure that it is sufficiently adapted to the actual needs and situations of the

countries concerned. The necessity of supplementing and relating to each other school education (technical and vocational) and practical training (on the job) cannot be emphasized too strongly.

	Labour force by type and grade of school completed						
	Grades XII-XV				Grades XVI +		
	General	Technical	Teacher training	Total	Science and other	Arts and other	Total
GROUP C							
In 1964	...	...	...	767.0	...	...	432.0
In 1970							
From 1964 stock	...	...	...	718.9	...	...	405.0
From 1964-70 output	772.6	902.0	300.3	1 974.9	429.1	298.8	727.9
Total	...	...	...	2 693.8	...	...	1 132.9
In 1975							
From 1964 stock	...	...	...	674.8	...	...	380.1
From 1964-70 output	748.7	874.0	291.1	1 913.8	415.4	289.3	704.7
From 1971-75 output	938.6	1 135.2	193.0	2 266.8	301.6	327.1	628.7
Total	...	...	...	4 855.4	...	...	1 713.5
In 1980							
From 1964 stock	...	...	...	626.5	...	...	352.8
From 1964-70 output	724.4	845.6	281.6	1 851.6	401.1	279.3	680.4
From 1971-75 output	910.0	1 100.5	187.1	2 197.6	292.0	316.7	608.7
From 1976-80 output	1 290.3	1 520.7	165.8	2 976.8	332.5	487.1	819.6
Total	...	...	...	7 652.5	...	...	2 461.5
THE REGION							
In 1964	...	...	...	3 821.0	...	...	2 262.0
In 1970							
From 1964 stock	...	...	...	3 581.7	...	...	2 120.4
From 1964-70 output	2 974.7	3 101.9	1 773.9	7 850.5	1 337.2	1 580.1	2 917.3
Total	...	...	...	11 432.2	...	...	5 037.7
In 1975							
From 1964 stock	...	...	...	3 362.0	...	...	1 990.3
From 1964-70 output	2 882.4	3 005.7	1 719.2	7 607.3	1 255.3	1 529.5	2 784.8
From 1971-75 output	3 928.4	3 898.3	1 252.1	10 078.8	1 547.1	1 571.7	3 118.8
Total	...	...	...	21 048.1	...	...	7 892.9
In 1980							
From 1964 stock	...	...	...	3 120.9	...	...	1 847.5
From 1964-70 output	2 789.0	2 908.3	1 663.3	7 360.6	1 212.2	1 477.0	2 689.2
From 1971-75 output	3 808.6	4 748.8	1 213.9	9 771.3	1 498.1	1 521.9	3 020.0
From 1976-80 output	5 929.6	7 808.8	1 122.2	14 860.6	2 222.8	2 020.0	4 242.8
Total	...	...	...	35 113.4	...	...	11 799.5

Note. In order to estimate the number from the 1964 stock who will be in the labour force in 1970, 1975 and 1980, in addition to applying the survival rate, account has been taken of retirement from the labour force. The retirement age was assumed to be 65 years and, therefore, the 1964 stock aged 59-64 was assumed to retire by 1970; the 1964 stock aged 54-58 was assumed to retire by 1975 and the 1964 stock aged 49-53 was assumed to retire by 1980. Taking into account the estimated age distribution of the 1964 stock the following retirement rates were applied to the surviving stock: 0.0173 (1970), 0.0314 (1975) and 0.0408 (1980).

An analysis of 'Growth and Structure of the Labour Force in the Countries of Asia and the Far East' by You Poh Seng, (APC/BP/6), Report of the Asian Population Conference and Selected Papers, United Nations, New York, 1964, pp. 183-207, showed that the labour force participation in the region for the age group 25-34 was generally above 96 per cent for males and around 50 per cent for females. Taking into account that labour force participation rates of the educated population are substantially greater than that of the total population, an estimate of 90 per cent was used for the net output from Grades XII and above.

Chapter 3

Problems of educational development— some implications of the Model

General approach

The preceding chapter presented the needs and prospects of educational development in the region during the period up to 1980. Its main purpose was to identify the broad goals for future endeavour and the common problems for which solutions have to be found. It seeks to express, in quantitative terms, values which are essentially educational.

Educational growth, which has both quantitative and qualitative aspects, involves a large variety of factors. It is not the purpose of this chapter to deal with all these factors. Its concern is limited to drawing attention to the principal implications of the Model and to identifying some of the 'strategic areas' in which action is essential if the educational, economic and social purposes implicit in the targets for educational development in Asia are to be realized.

Since the educational goals and objectives of the countries in the region are broadly common, they have also broadly similar problems of educational development. Within this broad framework, however, it is important to recognize that there are also national differences of a social and cultural character which, together with differences in stages of over-all development—and hence of needs—should be taken into account in planning for education and for determining the strategy of development most appropriate to the particular conditions of each country. The projections for the three groups, from which the Model for the region as a whole is constructed, are illustrations of a possible way in which the pattern and pace of development for the immediate future and the order of priority may be varied to accord with the existing level of socio-economic development and its emerging needs. For example, areas which are in the process of transition from a subsistence economy, and the social structure that is characteristic of it, have school facilities on a very limited scale. In these areas, it

will be advisable to give special emphasis to the role of the school as a community centre and to develop the programmes of educational expansion concurrently with those for adult education, one reinforcing the other and becoming integrated in one unified system. The use of mass media of communication can contribute significantly to the pace of development. High priority will need to be given to the second level of education so that it may supply the middle level manpower required for all sectors of national life including teachers for primary schools, as well as craftsmen, artisans and extension workers for the agriculture sector. Since it will take some time to develop the third level of education adequately, provision of training opportunities abroad may be the most important source for the supply of the highly qualified personnel needed for developing national institutions. In drawing up long-term plans in these areas and thus to lay the foundation of a modern system of education is a task that will call for special care in deciding on the structure and internal balance of the education system.

In areas where school facilities are available to a majority of children and the goal of universal primary is within reach, a high degree of urgency would seem to attach to reorienting secondary education for greater flexibility so that early specialization and the 'academic' nature of the programmes may give way to a broad foundation which includes scientific knowledge as well as the humanities. Vocational and technical education, particularly agriculture education, at secondary and post-secondary stages, would call for rapid development. Two essential prerequisites for it are marked improvement in the quality and extension of facilities for science and mathematics education. While an increase in the facilities for higher education will be necessary, higher priority may have to be accorded to raising its quality and shifting the balance in the distribution of enrolment from

'humanities' to science and science-based disciplines. Of special importance would be the establishment and development of non-university institutions at the third level for training technical and agriculture personnel. The task of adult education may well lie primarily in up-grading the skills and cultural level of the adult manpower, to which educational institutions at all levels should be in a position to make a major contribution.

In the countries with high enrolments at the first and second levels, measures may be needed to ensure that pupils with high ability have access to higher education. Improvement in the quality of education at all levels would require special attention. In vocational and technical education, greater development will be needed in two- or three-year non-university institutions at the third level to prepare technicians and correct the existing imbalances in the training and distribution of technical personnel. Avenues for further education for adult population would have to be extended and integrated into the over-all educational system. Of critical importance in these countries will be the role of research institutes and their capability for adapting modern science and technology to their own needs.

There are two other sectors of education which have not been dealt with extensively in this document. First is that relating to the pre-primary child. His care and education (using the latter term in its broadest sense) are important elements in the formulation of a social policy and may have important bearings on some aspects of educational policy. Education at the pre-primary stage has so far remained limited mainly to big urban centres and to that section of the population which could afford it. A beginning is being made now in some countries of the region to develop a wider base for pre-primary education. It has been found that children who have had pre-primary education in some form are better prepared for introduction to formal education. Experience also seems to indicate that it may also have some important bearing on the problem of drop-outs. In some countries of the region, institutes for child study have been established and attempts are being made to evolve patterns and organization suited to indigenous conditions for the care and education of pre-primary children on a wide scale, particularly in the rural population and the depressed areas of the growing urban centres. This development needs to be actively encouraged not only as an aspect of social but also of educational policy.

The other sector is university education. Universities have a crucial role in the cultural, social and economic advance of a country in training for leadership and preparing high-level manpower. Equally important is their

function to provide leadership in initiating educational change and promoting qualitative improvements over the whole field of educational endeavour. No attempt is made in this document to discuss the order of priority of various fields of training covered by university education, such as initial training of high level personnel in public administration or economic planning, obviously needed by the countries concerned for their development. In the Model, details relating to the universities are however held to the minimum and are given only to the extent they are needed to present the picture of the education system as a whole and the broad structural changes that education development would require in the context of over-all economic and social development. For more specific treatment of university education, attention is invited to the *Summary Report and Conclusions of the Study on the Role of Institutions of Higher Education in the Development of Countries in South-East Asia*. It would be desirable to have a similar study for other countries of the region not covered by the present study.

A problem common to all countries in the region, and perhaps to all developing countries, arises from the social gap that tends to be created between educated population, which is bound to be for many years a small section, and the mass of the people who have had no or little education, and their respective ways of life. The aversion of the educated section to manual work, which is a familiar phenomenon, tends to widen the gap. On the one hand, adult education is obviously indispensable if the 'social gap' is to be narrowed: on the other hand, adaptation of the curriculum more closely to community life is essential. But these measures may need to be supplemented by others of a more comprehensive character. For instance, some of the countries in the region have been considering 'work experience' or 'constructive social work' programmes, involving the students in the upper second level or the first year of higher education in development projects to give them direct experience of constructive processes of work. This again brings into relief the urgent and growing need for an expanded and integrated adult education programme which should concentrate in the first development phase on the needs of the lower income groups. These adults should have greater access to schools (primary and secondary) and technical institutes, as well as correspondence education. It is from these groups that middle level cadres will have to be trained. This adult education programme will of course be developed in connexion with over-all development programmes, but should concentrate on economic priorities.

The projections for education up to 1980 imply a considerable expansion at all levels. The question arises

whether expansion of this order will adversely affect the quality of education.

It is one of the fundamental assumptions of the Model that numerical expansion and qualitative improvement must move together, though the emphasis in this respect may vary somewhat from one level or type of education to another. In planning for balanced educational development, special care will have to be taken to ensure quality.

Reference was made earlier to one of the objectives of educational development—namely, to use on an increasingly wide scale the ‘ability reserves’ of a nation. That these reserves of general and special abilities are much more extensive than those which the existing educational systems have so far been able to mobilize is beyond doubt. To the extent that expansion of educational facilities creates new opportunities for training and development and brings such reserves into use, there is justification to hold that the quality of education need not suffer on account of the increased number of students who will be entering different levels of education.

Quality in education, however, has to be planned for: it does not come off as a by-product. Its improvement is a continuous process and as such has to be built into a plan and its implementation. The risk to standards—and it is a risk that should not be minimized—arises when numerical increase is allowed to take place without adequate advance preparation, provision of staff and other facilities, and without carrying out in time the adjustments and changes that expansion necessitates; for example, in curriculum reconstruction, the training methods, the selection procedures and guidance techniques. In this connexion it must be stressed that the Model is not based on a static concept of the methods and resources of teaching. It is assumed that countries will apply important new teaching resources, such as radio, television, audio-visual aids and programmed instructions, in order both to extend the quantity of pupils reached and the quality of instruction.

The Model takes account of the relationship of quantitative expansion and qualitative improvements within the framework of the cost structure. In the last analysis, both expansion and quality are reflected in the costs, though there are some important ways in which educational efficiency may be enhanced without appreciably increasing costs (for example, in the area of curriculum and teaching methods). The costs of expansion and qualitative improvement have, therefore, to be adequately adjusted within the given ceiling of resources. To find a proper balance at different levels and types of education is a matter of policy judgement. The Model can be considered, in this context, as one of the possible plans to secure a balanced development of education.

As with school education, adult education has in the past also been oriented too heavily towards academic goals rather than meeting the needs of advancing industrialization and modernization. Literacy programmes until very recently were limited to reading and writing and did not have a functional purpose. School and adult education were considered as separate entities and not complementary to each other. Programmes of further education were often focused at a level which was too high to be of service to the needs of the majority of the working population.

The objective of balanced development (with correction of existing imbalances, where they exist) within the framework of given resources necessarily implies determination of priorities. In the paragraphs that follow, an attempt has been made to identify what may be regarded as the strategic points for action implicit in the development envisaged in the Model. The guiding criteria in identifying these areas of critical importance are that: (a) they are common to all countries in the region, though the forms in which they present themselves may vary; (b) these areas are essential for the achievement of the targets; (c) they are in the nature of ‘leading sectors’ which have the maximum potential for influencing other sectors in education as well as economic and social development generally.

For convenience of presentation, these strategic areas may be grouped into two categories, which are, however, closely interlinked, namely:

1. Those which help to extend the range of education through expansion including education of girls and women, and adult, family and youth education.
2. Those which aim at qualitative improvement and are closely related to national programmes of economic development, of which the main areas are: educational administration and planning; the problem of wastage and drop-outs; the training of teachers and supervisors including in-service training; educational research; general, vocational and technical education including agriculture education; science education.¹

Educational administration and planning

The experience of planning in many countries has shown that even well conceived and technically sound plans have often failed to fulfil the expectations with which they were launched, mainly because the administrative

1. In the subsequent sections of this chapter, the topics are presented in the order in which the conference recorded its recommendations on them.

apparatus was not adequate to the new tasks. Sound administration has a key place in the structure and articulation of national education systems. The reorganization and strengthening of the administration should precede the stage when a plan is put into operation. Timely and adequate investment of the resources for this purpose will be amply rewarding.

The scale of educational development in the region during the coming decades will be one of unusual magnitude and complexity. It will call for careful appraisal of the existing system of educational administration, and possibly for extensive changes. For facility of discussion, the likely changes in the machinery of administration, though they are closely interlinked, may be considered under three main headings: (a) changes that relate to the structure of the organization; (b) those that are connected with the personnel manning the organization, and (c) those that arise from planning and its special requirements.

A prominent feature of the educational enterprise in the coming years will be its size. Even today in every country it is one of the most extensive undertakings. In the decades ahead the number of educational institutions and personnel will increase about fourfold. The sheer increase in the size of an enterprise calls for fundamental changes in methods and organization.

There is considerable variety in the administrative traditions which prevail in the countries of the region and the solution to the problem of structural size will obviously be sought in different forms. But however diverse the traditions may be, there are, it would seem, certain directions in which action may be urgently needed:

1. Devolution of greater responsibility and authority to subordinate agencies at the provincial/regional and district levels;
2. Clear definition of responsibilities and functions at various levels and operational units;
3. Securing rational distribution of highly qualified staff between central offices and subordinate units so that the latter may be strengthened;
4. Harmonizing the public and the private sectors in education;
5. For ensuring continuity, providing legislative base in place of executive orders to educational policies and programmes to the maximum extent feasible;
6. Devising an adequate machinery for inter-ministerial co-ordination as well as for co-ordination between different levels within the educational establishment;
7. Creation of organization and methods units in all main operational units for formulating technical procedures to facilitate work and to review the working of these procedures from time to time;

8. Organizing machinery for systematic evaluation of programmes in operation;

9. Establishing of advisory bodies to serve as channels for public opinion on education or securing expert advice from outside the educational establishment.

A general weakness in the machinery of educational administration in the region is the lack of breadth in institutional structure. When the scope of the educational enterprise was limited, the institutional structure comprising only schools and universities or colleges was not inadequate. New work that came up could be dealt with on an *ad hoc* basis by the department or the ministry. The situation is rapidly changing now, and the change will be even more far-reaching in the coming years. Specialized institutions are needed to cope with the new demands that will be made on educational administration. In the preceding sections of this document, the recommendation that has been often reiterated is for the development of specialized institutions—institutions for the training of teacher educators, research institutions, national centres for scientific materials, documentation centres and so on. Unless the institutional structure is broadened, it will not be possible for the machinery of educational administration to meet the new tasks with informed judgement.

The personnel in the administrative structure of education cover a diverse range of functions, and carry varying degrees of administrative responsibilities. On one end of the scale is the teacher whose administrative functions are normally limited to the school organization; on the other end is the policy maker whose functions cover the whole range of the educational endeavour. Between the category of administrative personnel, which is nearer to the policy-making functions, and the teachers and the instructional staff, there are the supervisors or inspectors who combine the administrative and the directly educational functions in varying degrees, which differ markedly from country to country according to their educational traditions.

There are three main directions in which the administrative personnel in education have to meet new demands as the scope and range of the educational enterprise expand. First, the educational administrator has to be a specialist in the art and science of administration. 'Educational' administration, apart from being a special field, is also a part of the more general field of public administration from which it derives. Accordingly, the educational administrator has to be well informed on the modern techniques of administration and administrative theory. It may no longer suffice for an educational administrator to be guided by rule-of-thumb. Training in administrative procedures and techniques is essential to supplement on-the-job experience.

Second, the educational administrator has to be fully conversant with new developments in theory and practice in his field, that is, education, as well as the other disciplines that bear on education. Administrative insight may be said to consist in seeing the relevance of new ideas and practices to present realities. Many a promising change has failed because the administrator was not responsive to it. During a period when the education systems will need to undergo many far-reaching changes, the educational administrator has to be not only an organizer but also intellectually equipped for the task. The one prominent feature of modern administration in general, and of educational administration in particular, lies in the fact that the specialized professional staff forms an increasing proportion of the total personnel.

Third, in the formulation of educational policies and programmes, specialized knowledge of a large range of subjects is needed. It is now being increasingly recognized that specialists such as economists, scientists, architects and those in other fields supporting education are needed in educational administration as much as professional educators. Education cannot contribute effectively to social and economic development unless there is commerce of ideas between the educators and the specialists from other disciplines. This has important consequences for the organization of educational services, which have to be far broader in scope than they have been traditionally, and should include those who have had their professional experience in other allied fields of specialization.

At present there are no systematic arrangements for the professional training of educational administrators. There seems to be a widespread belief that all that is needed to become a good educational administrator is to have some knowledge of pedagogy and some years of service: the rest can be picked up on the job. Professional training of educational administration is a matter requiring urgent attention, and it is suggested that advanced training facilities should be created in each country. These could appropriately take the form of 'staff colleges' for educational administrators, planners and supervisors, with opportunities for them to meet administrators from other sectors—both government and private, and also other educational workers such as researchers and specialists from universities. The national staff colleges for educational administrators could be usefully associated with a centre at the regional level to provide for interchange of experiences and further training of key personnel. Facilities for training abroad would be a valuable supplement to national and regional training programmes.

Planning and the administrative structure have a profound influence on each other. The execution of plans

is perhaps even more important than their organization. Growth can to some extent be achieved without planning, but planning alone will not bring about growth. Planning and execution have to be closely linked in all stages of planning and at all levels of execution.

One of the prerequisites of planning and execution is good statistical information. In the total educational structure, development of an efficient statistical service is of basic and primary importance. The strengthening of the statistical organization has to be done at all the levels and simultaneously—in the educational institutions which are the primary sources of educational statistics, field offices, local and provincial bodies and the central office. Educational statistics have to be analysed in the context of other data and therefore close co-ordination between the different statistical agencies is necessary, for example, demographic and economic information. The type of statistical information that is required for educational planning is discussed in detail elsewhere.¹

To supplement the information received through periodic returns, the use of sample surveys should be used much more extensively than is being done at present. This would require strengthening of the central statistical office of the ministry and training of staff in the techniques of sample survey.

Good statistical information is only a part of the needs of educational planning. In addition, it needs a sound research basis, which should cover both educational and other sectors. Data on new techniques in education, of new ways of school organization, results of experiments, social and economic tendencies; all these form the research basis of educational planning. A research documentation centre is therefore an essential adjunct of the planning machinery.

Once the over-all plan has been made, it has to be resolved into programmes and projects.² Programming and project formulation are the core of effective planning.

Planning is conducted at more than one level, reaching ultimately the general population. Since all plans concern the welfare of men and women of the nation, their active acceptance of the key role of planning must be won.

1. The highest level of planning in the government defines the general policy and ensures co-ordination. The planning agency comprises representatives from various ministries having authority at the policy-making level.

1. See *Economic and Social Aspects of Educational Planning*, Paris, Unesco, 1964, particularly Chapters VIII and X.

2. These terms are used with the meaning assigned to them in *Economic and Social Aspects of Educational Planning*, *ibid*, Chapter XI.

2. The second level of planning is within the Ministry of Education and is concerned with drawing up the detailed programmes and following their implementation in a continuous sequence. It is here that a wide range of specialist knowledge is needed, in which respect the existing machinery is not too strong. This unit would naturally co-ordinate with the higher levels and co-operate with other ministries in addition to establishing the necessary liaison with the executive administrative organization with its own departments of education.
3. Successful execution of plans and programmes cannot be achieved without a high degree of involvement of the executive staff, at all levels in the process of planning and analysis of the problems of implementation. It is a major problem demanding attention. Every step of the plan's development should be accompanied by a campaign to explain its aims to those who will be affected by it. Information regarding plans and planning should be widely diffused in the population in general and opportunities for discussions, and presenting suggestions need to be specifically provided for. In a continuing programme a reference to that which has been achieved by the people may, in addition to reinforcing involvement, actively supplement even material resources.
4. The educational development tasks are required to be accomplished on a relatively shorter time base than was available to the more fully developed countries for the corresponding stage of development. When the time base for development is inordinately cut down, as it has to be in the Asian region, and when this is coupled with high magnitudes and complexities, it will be imperative to supplement the experience within the system with the systematically analysed experience of others outside the system.
5. The planning process involves the need for a much greater measure of co-ordination than ordinary administration does. It has also to draw upon a larger variety of experiences. A machinery such as is provided by committees or working groups is required to ensure co-ordination within the various departments in the Ministry of Education, with the different elements in the educational system (universities, private schools, teachers) and with the 'consumers' and the public (parents' associations, trade unions, employers' associations).
6. The planning process does not end the moment the plan is put into operation. On the contrary, the planners and the executive staff must be directly involved in periodic evaluation of the various phases and

parts of the plan, first because planning calls for periodic adjustment and should be sustained by 'feedback', and second because it is a constant search for improved methods and techniques. Evaluation is not very effective when carried out by outside; it is most useful when it takes the form of self-evaluation. Just as the educational administrator has to be trained in the techniques of planning so he has also to be prepared in the techniques of evaluation.

The problem of drop-outs and wastage

Wastage in education (represented by drop-out pupils who discontinue their studies before acquiring functional literacy and those who repeat a grade) is one of the most serious and persistent problems in the region and is indicative of the low 'productivity' of the education systems. It presents itself in an acute form at the first level, where it is estimated that, for the region as a whole, out of 100 children who enter Grade I, not more than 40 reach Grade V. This implies waste of human and financial resources of a staggering magnitude. The amount of drop-out which occurs is so great that the cost of education is raised by about three to four times the basic cost which otherwise would have been incurred.

TABLE 33. Progress of a cohort through grades, most recent periods¹

Country	Cohort beginning in	Grades					
		I	II	III	IV	V	VI
Afghanistan	1955	100	80	69	74	57	50
Burma	1956	100	33	26	² 19	—	—
Cambodia	1955	100	77	71	67	52	55
Ceylon	1956	100	76	69	64	57	51
China, Rep. of	1957	100	95	94	92	92	88
India	1956	100	63	47	37	² 29	—
Iran ³	1956	100	96	92	92	74	67
Korea, Rep. of	1959	100	95	93	89	88	86
Laos	1956	100	45	49	23	16	13
Malaysia	1957	100	91	84	81	71	70
Singapore	1958	100	94	90	85	² 79	—
Mongolia	1961	100	96	94	—	—	—
Pakistan	1956	100	46	33	26	² 25	—
Philippines	1955	100	84	76	69	55	43
Thailand	1959	100	68	61	² 53	—	—
Viet-Nam, Rep. of	1959	100	73	60	45	40	—
Japan	1959	100	100	100	99	99	99

1. Figures for Indonesia not available.

2. Indicates terminal grade in the first stage.

3. Figures relate to urban schools.

Note. Estimation of the extent of wastage should distinguish between drop-outs and repeaters. Since data are not available for the two separately, reference to 'drop-outs' includes the repeaters (the majority of the latter do ultimately drop out).

Table 33 shows for countries of the region the progress of a cohort through the grades year after year, and indicates the magnitude of the problem.

In spite of the fact that the problem of drop-outs is of crucial importance, there are, surprisingly enough, only a few systematic research studies on the subject. Such studies as are available show that: (a) the highest incidence of drop-outs—from 40 to 60 per cent—occurs between Grades I and III; (b) it is higher in rural areas than in urban schools, and amongst girls than boys; (c) over-age children are more likely to drop out of school than those whose age corresponds to the normal grade placement; (d) schools which are staffed by unqualified teachers tend to have a higher rate of drop-outs; (e) where repetition rate is high, drop-out rate is also high; (f) there is some evidence to suggest that the rate of drop-outs is higher in small-size schools.

The causes of drop-outs at the primary level and the efficacy of different methods to improve the situation need to be studied more systematically and extensively than has been done so far. Socio-economic factors undoubtedly contribute to irregular attendance and drop-outs—malnutrition and poor health which undermine the capacity of many children to attend school regularly; use of child labour for domestic duties or to help out parents during the peak season of agricultural operations; parental inability to bear educational expenses on textbooks and writing materials and at times parental attitude to education which may range from apathy to even hostility. The causes of drop-outs are not, however, only social or economic. As important, and perhaps more than is generally believed, are factors which have their origin in the school. Unattractive schools, functioning with inadequately prepared teachers; lack, and more often, complete absence of good instructional materials and textbooks; a curriculum that is ill-adapted to the needs of the child or his environment; teaching methods and evaluation procedures which fail to give him a sense of continuous achievement and impose a rigid system of annual examinations that deprives the school of the freedom to develop flexible instructional programmes adapted to individual needs and learning pace of the pupils—these also account for a large and possibly major proportion of drop-outs.

In connexion with the last point, it is of interest to note that countries in the region which have adopted the system of grade promotions without tests for the purpose in the beginning grades have been able to reduce the incidence of drop-outs substantially in a short time. There is much to be said in favour of this system, provided that due attention is given to the training of teachers.

Many failures are what have been described by an educator as 'administrative' in that they represent not so much a deficiency in the child but rather unrealistic expectations of the curriculum planner. Adjustment of the curriculum expectations in the early grades need not lead to lowering of over-all standards. Children who go along more slowly in the beginning may attain just as high standards in Grades IV or V. And certainly many more of them will get there.

The goal of universal education at the first level implies that provision of educational facilities should be both adequate and effective. Quantitatively, adequacy and effectiveness could be measured not only by the number of pupils enrolled but also in terms of the time they stay in the education system and their progress from grade to grade. It is therefore important that in national plans the targets of enrolments should be expressed both by enrolment ratios and the percentage reduction in drop-outs and repeaters.

In the Model the projected levels of enrolments are based on the assumption that a marked reduction in drop-out rates would be brought about in all countries, even though, considering the economic and social factors, it may not be possible to eliminate drop-outs altogether except in some countries in Group C. If drop-outs were to continue during the next fifteen years at the same rate as at present, a much larger enrolment in the first grade would be needed to realize the enrolments envisaged in the Model at different levels and the cost would be substantially more.

In dealing with a problem of this magnitude and complexity, piecemeal measures are unlikely to give results within a period of time consistent with the goal of accelerated development of education. The experience of many countries of the region has shown that retention rates do not improve with the mere passage of time, but that when well-designed and concerted measures are taken, they have succeeded in a relatively short time in reducing the incidence of wastage and improving retention rates. The imperative need is to develop and implement in a sustained manner a comprehensive programme combining the various remedial measures.

The teacher, in this as in the entire field of educational endeavour, is of supreme importance. His professional pre-service training and periodic in-service training should be more sharply focused (which is not the case at present) on the problems of primary education, particularly wastage and retardation. Introduction of such measures as 'automatic' promotion or ungraded class organization is unlikely to give stable results unless the teachers are adequately trained to be able to make

effective use of them. Beginning grades require teaching skills of a high order, which cannot be ensured if, as is the practice in some countries, teaching in these grades is assigned to untrained or newly recruited teachers. It is desirable that the most experienced teachers, particularly those skilled in teaching reading and techniques of remedial teaching, should be used in the early grades and the machinery of supervision should be strengthened in order to provide adequate consultative services to the teachers.

Teaching methods, curricula, textbooks and instructional materials and evaluation procedures are inter-linked phases of the same educational process. In the programmes for qualitative improvement of schools and reduction of drop-outs, high priority should be given to the revision of the curricula to adapt them to the varying needs of children who, with expanding enrolment, now represent a much wider range of differences in environmental background and mental capacity; to the production and supply of attractive but inexpensive textbooks, children's books and other instructional materials; and to improving the evaluation procedures for assessing the progress of the pupils.

New techniques of teaching and learning have opened up highly promising possibilities which need to be exploited on a large scale. Adapted to the Asian situation and systematically worked into the regular school programmes, they could make a decisive contribution to increasing the holding power of the schools.

For effective implementation of any programme, active involvement of the community served by the school is essential. Here one of the links of formal education with adult education comes in. Community support is needed not only to generate local material resources to help the school but also for changing through parental counselling, attitudes unfavourable to children's educational progress.

In the particular economic and social circumstances in which most of the schools function, programmes such as provision of school meals and supply of free textbooks (which can also be supported partially by local community resources) deserve special attention. The experience of some of the countries where such programmes are in operation shows that they contribute directly to improved attendance in schools. For example, in Ceylon the programme of school meals has led to a reduction of drop-out rate.

It is advisable that a comprehensive and integrated programme should in the first instance be started as experimental projects in every country of the region, in carefully selected areas which are representative of the varying conditions obtaining. Large-scale operations have

greater chance of success if they are built upon experiences acquired first in carefully designed pilot projects to try out the content of the programme and the methods and organization appropriate to it.

After the heavy incidence of drop-outs in the beginning grades of primary schooling, a sharp decline in enrolment occurs at the point where pupils have to transfer to another school to continue their education. 'Incomplete primary schools' (that is, schools which do not have all the grades minimally required for full primary education and functional literacy) contribute to increasing the rate of wastage. In any scheme for expanding effective enrolments, high priority should be given to up-grading incomplete primary schools.

The concept of drop-outs is to be interpreted somewhat differently at other stages of education beyond the first level. It generally takes the following forms: (a) students withdrawing from studies before completing a full course; (b) failure in the examination required at the end of a full course, which may lead to withdrawal from studies or repeating the grade; and (c) inability to undertake further studies by successful students with a high ability potential.

Of all forms of waste, the one represented by (c) is the most serious. Studies carried out in some of the advanced countries show that wastage in this form is substantial even there. Though such studies are not available for Asian countries, there is a strong presumption that considering the high rate of attrition that characterizes the education systems at all levels in the developing countries, the loss of high ability potential occurs on a considerable scale. Recognizing this, some of the countries in the region have been working out experimental projects for the identification and development of talent from an early age. It appears advisable to give special attention to this line of development.

Wastage in the form of 'failures' is very high in most countries in the region. It results either in the withdrawal of students or prolongation of the normal period needed to complete a course of studies. It is estimated that on an average only 50 per cent of those who prepare for the school-leaving examination graduate successfully. The projections made in the Model assume that a considerable improvement would take place in the graduation rate. Such improvement, it is envisaged, will be facilitated by the diversification of the second-level education and a parallel diversification at the third level through the development of technical and sub-professional institutions. For realizing the aim of diversification, which is to give to pupils an education of the type suitable to their abilities and aptitudes, the methods of selection, guidance and allocation, and the scientific determination of

entrance requirements for different types of education, are of fundamental importance. Research studies have shown conclusively that the examination system at present has limited validity as a measure of pupil achievement and is inadequate as a tool for selection and allocation. It is therefore necessary that attention should be given in the coming years to evolving improved testing and evaluation procedures to assess the students' performance and potential. Entrance requirements and guidance techniques and services in a form adapted to Asian conditions have also yet to be devised and instituted.

Training of teachers and supervisors (including in-service training)

Teaching personnel

The training of teachers should have the highest priority in any programme of education. In the Model the supply, qualification, and training of teachers for different levels and types of education are treated as crucial factors in determining the rate of expansion and the balance between expansion and quality. Lack of buildings or equipment or instructional aids will not hinder educational advance as decisively as the lack of suitable teachers. Their status, conditions of service, and the recognition given to their qualifications and experience are therefore of basic importance.

The order of educational expansion in the coming years is reflected in the increase in the teaching force. Compared to 1964, the teaching force in 1980 would have more than doubled both at the first and second levels. This would imply a rapid expansion of training facilities. But to match the supply quantitatively to the needs is not enough. The schools of the nations are entitled to claim a due share of the higher ability group that they help to nourish. The Model postulates a shift in the educational qualifications of the teaching force to a continuously rising level linked appropriately to salary incentives.

It is envisaged that the teachers for the first level of education will be prepared mainly in teacher-training institutions and for the second level in university institutions. As the required qualifications for the first-level teachers are raised and the existing differences between their qualifications and those of second-level teachers are considerably narrowed down, the principle of a unified teaching profession for the schools would be so much nearer to being realized. During the period of transition,

the teaching force will, however, represent different levels of qualification, but the balance will shift perceptibly from lower to high qualifications.

Table 34 gives the percentage distribution of new entrants to the teaching force by levels of qualifications as projected in the Model and shows how the shift to higher qualification may take place.

TABLE 34. Percentage distribution of new entrants to teaching force at the first level of education, by qualification, 1964, 1970, 1975 and 1980

Qualification: 10 (basic schooling) + (professional training)	1964 (estimated) Group			1970 Group			1975 Group			1980 Group		
	A	B	C	A	B	C	A	B	C	A	B	C
10 or less	60	15	5	37	5	—	20	—	—	—	—	—
10 + 2	30	58	30	40	35	5	50	10	—	60	—	—
10 + 3	3	20	30	12	35	30	16	53	25	20	60	20
10 + 4 (or 12 + 2)	5	2	25	8	18	52	10	27	60	15	30	60
12 + 3 or more	2	5	10	3	7	13	4	10	15	5	10	20

A variety of patterns for the training of teachers for the first level exist in the countries of the region and even within the same country, ranging from eight years of basic schooling with one or two years of professional training to twelve or thirteen years of schooling and one or two years of professional training.

It has been urged with some degree of authority that the minimum essential requirement for a teacher should be full secondary education followed by three years of professional training. While this is a desirable goal it may not be possible to reach it by 1980, and therefore the targets in the Model have been expressed in terms of ten years' basic schooling followed by professional training ranging from a minimum of two up to four years according to the stages of development of the countries and their particular conditions.

The reorganization and development of the system of teacher training in each country calls for urgent action for the preparation of comprehensive and suitably phased programmes. For this purpose it will be necessary to carry out surveys of existing training institutions, assess in detail the needs for the coming years, and reorganize the programmes to provide for raising the qualification requirements and for lengthening the period of training. The curricula and methods in use in teacher-training institutions need to be examined with critical attention particularly in two directions: their relevance to the social and educational problems in the country, and secondly, to what extent they reflect the new insights

which modern advances in the basic disciplines of knowledge, including the science of education, have formulated.

Of special importance in the reorganization and development of teacher training is the preparation of teacher educators to staff new training institutions. The demand in the coming years for teacher educators will put the present sources of supply under a heavy strain. Moreover, teacher educators must be in the 'first flight' of progressive educational thought and practice if teacher training institutions are to become creative centres for educational advancement. The training of teacher educators, therefore, should be of vital concern, and it will be necessary to establish training institutions or courses for their further training and to prepare them adequately to staff new institutions. Teacher educators are generally recruited from amongst experienced teachers in the schools. This source of supply could usefully be supplemented by drawing into training institutions subject specialists (such as scientists, psychologists, sociologists) who have distinguished themselves in their special fields of study.

As the level of teacher-training institutions for primary education is raised, it will be desirable to bring them into closer association with universities and institutions at the third level to ensure inter-disciplinary approach in developing teacher-training programmes. This will also mark a step towards the evolution of a pattern in which teachers for different subjects and levels of education receive their professional education together.

The size and location of training institutions will need special consideration in preparing a long-term programme. In countries of Groups A and B, expansion of education will take place on a large scale in rural areas and it will therefore be desirable to locate training institutions, as far as possible, in towns (other than big cities) which offer the type of environment in which the teachers under training will later go out to work. Care will have to be taken, however, that the training institutions are not so located as to isolate them from intellectual commerce with other educational institutions.

At present the training institutions in the region vary in size from an average enrolled strength of 100 students in some countries, to 400 in others. While for securing a better locational distribution of training institutions it may unavoidably be necessary to have some relatively small institutions, as a general principle, it is preferable to have training institutions sufficiently large in size to be able to secure greater range in staff competencies, composition of student body and more intensive use of library and equipment facilities.

In a training institution, the prospective teacher does

not only learn the elements of his art. His professional education should also be designed to cultivate in him a sense of belonging to a profession. It is therefore highly desirable that training institutions should be residential, with teachers under training and members of the staff living on the campus. The needs of women teachers will require special attention, and particularly those of married women teachers under training with family responsibilities.

Resort to emergency programmes for the training of teachers should become less necessary if the development of training facilities is planned in advance, reviewed periodically and brought up to date. Where an emergency training programme is unavoidable as an expedient to deal with a shortage, it should be recognized as a temporary measure, and facilities should be provided at the earliest opportunity for teachers trained in this way to complete the full professional training through in-service courses. In some countries of the region, however, the preparation of women teachers will require emergency measures, which may have to be prolonged till educational facilities for girls are adequate. To ensure an adequate supply of women teachers particularly for rural areas, it may even be necessary to provide condensed courses in general education to enable literate women to qualify themselves and participate in emergency training programmes.

New teachers for first-level education will be drawn mainly from young graduates from second-level general schools. It is suggested that graduates from vocational and technical schools should also be encouraged to enter teacher-training institutions and prepare for teaching in general schools. Their education in practical arts will be a useful supplement to the other competencies represented by the teaching staff of a school.

Teachers for second-level schools are prepared by universities and institutions with degree-conferring status. In the main there are two patterns of teacher training for second level existing in the region: one in which professional training and general education are given concurrently and spread over three or four years leading to a degree, and the other in which one year's professional training is given after a degree in the academic course has been taken. The general trend is increasingly towards adopting the former pattern which enables the academic education of the prospective teacher to be related more closely to his professional education and future work and gives him a longer period for professional orientation.

One of the main problems in the training of teachers for second-level education is to match supply to needs. Unlike teachers of the first level, teachers of the second-

level schools are also subject specialists. It is not therefore enough to ensure that the output of trained teachers matches the needs of the school system quantitatively. The demand has to be assessed in terms of teachers required for different subjects in the curriculum. Such assessment through regular periodic surveys should be an essential part of programming for teacher training, and the intake of universities related to the needs that are thus disclosed. The subjects for which there are acute shortages are science, mathematics, vocational studies and foreign languages. In some countries of the region, special training institutions have been established for preparing teachers for these subjects, and incentives by way of scholarships and loans are offered to attract graduates to the teaching profession.

In addition to teachers, the educational enterprise will require an increasing number of high-level specialists in education: researchers, guidance personnel, educational psychologists, specialists in new techniques of education, educational sociologists, etc. Much more extensive facilities than are available at present in the region will need to be developed by the universities for post-graduate studies in education to meet these special requirements.

With the diversification of education at the second level envisaged in the Model, and the consequent need for educational and vocational guidance, it will be necessary to have programmes for training of career masters and school counsellors. This is a relatively new field and only a few countries in the region have training facilities at present. The lines along which educational and vocational guidance services should be developed will have to be carefully considered. As a first step, it might be advisable to give higher priority to the training of selected teachers as to career masters, and evolving the tools and techniques for guidance and counselling, suited to local conditions. The provision of full-time school counsellors would be more fruitful when the tools of guidance and adequate training facilities for the personnel have been created.

New entrants to the teaching force in any year form but a small proportion of the total. For qualitative improvement the level of the whole teaching force including the teachers in service has to be progressively raised. Further education of teachers in service has therefore as high priority as pre-service training.

There are broadly three types of steps to be taken: (a) to keep the teacher abreast of modern advances in educational theory and practice and in his own field of specialization; (b) to enable teachers who do not possess adequate qualifications, or are not trained, to acquire needed qualifications; and (c) to help qualified teachers to improve their qualifications further.

Many countries in the region have been developing in-service training programmes during recent years, and in a few countries it has already established itself as a permanent feature of the education system. Professional organizations of teachers are taking a leading part. Regular exchange of experiences between the countries will be of considerable benefit in devising forms of in-service training courses appropriate to Asian conditions.

In-service training for the purpose of keeping the teachers abreast of modern developments in subject content and methods of teaching will call for the systematic involvement of professional organizations of teachers, teacher-training institutions and institutions of higher learning in organizing vacation courses. These will need to be supplemented by a network of consultation centres for week-end and other short sessions for advice and guidance, and for making available books and other materials. It is highly desirable for every teacher to attend in-service training courses at regular intervals and recognition should be given to such training in the salary scales.

To help teachers who do not possess the required qualifications, professional or academic, part-time teaching arrangements, and particularly correspondence courses, can be specially valuable. The system of instruction by correspondence has a great potential as an alternative way to education, and particularly for the in-service education of teachers. Modern techniques, such as programmed learning, can be used in combination with radio and television to increase the effectiveness of correspondence courses. It is suggested that countries in the region may organize pilot projects in correspondence courses and extend the programme subsequently in the light of the experience acquired.

Supervisory personnel

The quantitative estimates for teachers in the Model include the requirements of supervisory personnel, since supervisors and inspectors are drawn from amongst experienced teachers.

For the first level of education, the Karachi Plan suggested a supervisor-pupil ratio of 1:500 (or roughly one supervisor for 140 teachers). Only a few countries in the region have this ratio at present. At the second level, the requirements of supervisors have to be related not only to the geographic unit of administration but also the special needs of subject teaching.

The need for qualitative improvement in the education system invests the role of supervisory personnel with special significance. Such personnel include the principals,

who are the first line of supervision. Supervisory personnel should represent a body of highly qualified persons whose strategic competencies are utilized to up-grade the level of the teaching staff and the school programme, or to give guidance and leadership in creative innovation. Supervision has therefore to be essentially professional guidance of teachers, based on experience and informed judgement.

In making the projections, therefore, a considerable increase in supervisory personnel is envisaged. At the first level, the supervisor-teacher ratio would improve to 1:110 by 1980 (as against 1:140 suggested in the Karachi Plan), and at the second level it would be 1:250 by 1980, and should provide for specialist supervisors for scientific subjects and mathematics and language teaching.

In an earlier paragraph it was suggested that universities in the region should expand the facilities for post-graduate specialized studies in education. This should be one of the supplementary sources for recruiting supervisory personnel. Supervisory personnel should be encouraged by sabbatical leave arrangements and other facilities to acquire higher qualification through specialized courses at post-graduate level and training abroad. The principal form of training of supervisors/inspectors is, however, in-service training. In another part of this document, establishment of national-level institutions for in-service training of educational administrators including supervisory personnel has been suggested. From the point of view of improving supervision, these institutions should have a key role.

Educational research

The potential of educational research in providing guide lines for policy decisions has yet to be fully realized. The expenditure on research is on the whole so small at present that it is hardly a factor in educational costs. This is an area where investment will be richly rewarding. Only research can yield reliable guidance to the solution of such fundamental problems as curricular reconstruction, measurement of quality and standards, educational costs, teaching and learning processes, and the like.

The two most urgent needs in Asia would seem to be the development of an institutional structure for educational research, and the training of research workers. Educational research in the region is now generally carried out by university departments of education and teacher-training institutions. The topics of research that are chosen are not necessarily related to national problems

of education of immediate importance. Channels for the diffusion of research findings are yet to be systematically organized. An inter-disciplinary approach is essential for research in education and should be reflected in the programmes as well as in the staffing of research institutes. Not only are the problems of educational administration, curricula, textbooks, teacher training and educational finance closely interlinked; they cannot be adequately investigated without drawing upon other disciplines, such as public administration, economics, sociology and psychology. The growing point of educational theory and practice lies along the boundaries where these and allied disciplines meet.

Considering the variety and magnitude of problems that are bound to arise in the context of rapid educational expansion, it seems necessary to establish national agencies (in an appropriate form) for research in education. The functions of such agencies would include: (a) identification of the main and immediate problems requiring investigation; (b) undertaking or co-operating with other institutions for research on these problems; (c) giving technical assistance to other institutions for research; and (d) acting as clearing house for research information and diffusion of findings. The agencies should not only undertake research themselves but should also enlist the assistance of other institutions, particularly universities.

In recent years, a promising beginning has been made in some countries of the region by establishing national centres or institutes of educational research. Experience shows that considering the limitation of qualified research workers, it is desirable that the development of comprehensive institutes (where an interdisciplinary approach is possible) is to be preferred to establishing smaller units each devoted to a particular aspect of education.

International assistance and regional co-operation have a significant role to play in developing research expertise and in making research information available to the research workers in the region. The developing countries of Asia have problems very much in common and it is easier for a country to adapt the experiences of another country in similar circumstances. There is a wide and as yet unexplored field for undertaking co-operative research on a regional basis. It would facilitate the sharing of experiences and also serve as a training ground. Research on problems of common interest, as, for instance, causes and remedies of wastage in primary grades, the effective use of school accommodation, the supervisor-teacher and administrator-teacher ratios, etc., could be undertaken in a number of countries on a comparative basis. A regional programme of clearing-

house activities on educational research in Asia is also essential to ensure the maximum use of the fruits of research.

On the proper selection, adequate incentives, and training of research workers will depend how significantly educational research develops in the region. Since allied disciplines such as psychology, sociology, economics, etc., have contributed in a significant measure to the growth of educational theory and practice, one obvious need is to enable and encourage the research workers in these fields to undertake studies in educational problems. The second need is to open avenues to research to the young and eager minds in the teaching profession. The talent for research is a special ability and does not necessarily grow with chronological age.

Educational research at this stage of development should be more of the practical and functional type. Education in Asia is passing through a double crisis: quantitatively, a vastly increasing number of people must receive formal schooling for longer periods; qualitatively, a rapid change has to be brought about in the content and methodology of instruction. Therefore, at a time when the national educational systems are being reorganized and reoriented, the solution through research of immediate and pressing problems must necessarily have prior claim on resources. In this connexion, special mention must be made of the urgent need for research on educational techniques and their adaptation and application to the particular conditions of the countries in the region. The advances in scientific research and technological development have made available a range of new devices which are being placed at the service of teaching and learning. The new educational techniques affect all aspects of the teaching-learning process—curriculum, teaching methods, evaluation and instructional materials—and as such could provide a crucial leverage for changes aimed at qualitative improvement within a rapidly expanding educational system.

The invention of devices for communication, first to see and then to listen, and finally to do both simultaneously, has resulted in aids such as photographs, slides, filmstrips, silent and sound motion pictures, and in the development of radio and television broadcasting—each of which can be used as a teaching medium. They are of the very greatest importance in education because they operate at a lower level of abstraction than the more conventional printed matter and permit the student to get even closer to direct experience and relate it to what he studies.

The novelty of the new educational media is relative: what is new to some countries is not necessarily so elsewhere. On the other hand, there are some media of

instruction which are, for the time being, new everywhere, in the sense of still being at the experimental stage. The expression 'new educational media' may be taken to comprise programmed instruction, language laboratories and educational television, supported by slightly older media such as radio, films and projected materials, which in their turn change and evolve constantly along with the development of mass communication techniques.

The proper use of modern techniques in education can make the process of instruction more effective. It helps the student to acquire a better understanding of the phenomena he learns by rousing a high degree of interest in him, increases the visual and aural impact of teaching, relieves the teacher of purely mechanical work and enables him to concentrate on more creative aspects of his duties. The problem of improving educational methods through the use of modern techniques is closely connected with curriculum development and teacher training. The introduction of modern techniques to all spheres of education greatly depends on well-qualified personnel capable of solving numerous problems arising regularly in specific environments. Hence the training of such personnel is of primary importance.

Of the new educational media, programmed instruction may be singled out as it is a method of teaching (rather than a medium) which can be used in almost any sphere of education (general, vocational, professional, etc.) and can be presented through different channels from printed programmed manuals to teaching machines, including flip charts, filmstrips, slides and television. It combines under the principle of programming many of the theoretical ideas underlying teaching and learning which the advance of psychological research has contributed.

Each new educational medium and method, however useful in itself, expands its boundaries immensely when used in combination with other media. While there is a single objective in the teaching-learning situation, no single teaching tool can serve all purposes. The evidence is that the various teaching aids (e.g., books, laboratory equipment, films, programmed texts, laboratory manuals, radio and television lessons) work best to help the teacher and student if they are planned to form an integrated set. It is essential, therefore, that they be developed together as part of a plan with a very definite objective, which has to be specified operationally wherever possible. The adaptation of these new techniques to the particular situation in each country and to various forms of education and their introduction in classrooms calls for a high degree of research skill and educational insight and should appropriately have high priority in any programme of educational research.

Radio and television show drastic contrasts in Asia. Coverage ranges from high density in some countries to only the beginnings of a complete national service by radio in others. Organizational structures vary from government monopoly to private stations competing commercially. Programming serves above all information and entertainment. Varying efforts are made to include educational programming, but few countries make a systematic, large-scale and integrated use of broadcasting for education and development. The great potentialities of the film for education, instruction and training in schools and colleges, in agriculture and industry are not yet widely appreciated or exploited in Asia, where the cinema is generally regarded mainly as an entertainment medium. Although documentary and educational films are produced in many Asian countries, their circulation is usually limited to large cities and their immediate neighbourhood.

The educational needs of Asia make application of these media a matter of urgency. Among conditions calling for the use of broadcasting in formal education, are the wide dispersal of populations in rural areas; differences in quality between schools and teachers in rural and urban areas; the shortage of qualified teachers; the pressures on education in urban areas swollen by an influx of rural populations; the need for changes in content and methodology. Broadcasting is a potentially primary force in adult education, and social and economic development requires support from mass media in order to improve manpower resources and reorient economic practices.

Adult, youth and family education and literacy

A sound educational policy needs a balanced harmonization between all types and levels of education—school and out-of-school activities, the education of future generations and that of existing ones. New perspectives in knowledge need new approaches, and adults must be given opportunities for continuing their education at all levels, so that their individual lives can be enriched and their contribution to their societies enhanced. Emphasis on formal education for young people would need to be supplemented with simultaneous action for extending adult education and out-of-school youth programmes to prepare countries to respond immediately to urgent economic and social needs. It must also be recognized that youth and adult education programmes and formal education of children and young people reinforce each

other by preventing the perpetuation of illiteracy and semi-literacy in the population and should therefore constitute integral parts of the education system.

The fact was recognized by the World Conference on Adult Education (Montreal 1960):

'The conference recommends that it be declared as a fundamental principle of this conference that adult education is an integral and organic part of every national system of education, and that it should therefore receive within the system the attention and economic resources which this status justifies, in proportion to the necessities of each country';

and by the World Conference of Ministers of Education on the Eradication of Illiteracy (Teheran, 1965):

'Literacy teaching should be resolutely oriented towards development, and should be an integral part not only of any national education plans but also of plans and projects for development in all sectors of the national life. In view of mankind's needs today, education can no longer be confined to the school; the necessary promotion of adult literacy makes it essential to integrate all the school and out-of-school resources of each country.'

This recognition of the role of adult education in the total educational development in Asia was further elaborated at the meeting of the Ministers of Education of Asian Member States in Tokyo, the Asian Regional Conference on Adult Education at Saigon (April 1962), the Conference on the Role of Schools and Universities in Adult Education (Sydney, 1964), and at the 1966 Meeting of the United Nations Economic Commission for Asia and the Far East.

Educational orientation is directly influenced by the tempo and nature of changes in society. The impact of these changes on the individual and upon his community are producing profound disturbances in the traditional social and cultural values. Women are taking their place side by side with men in the development of their countries and full access to education must be available to them. It is necessary, too, that the common citizen learns more of the needs of this modern dynamic world and adapts and develops his life in keeping with rapidly changing conditions.

Economic and social development both in industry and agriculture are making new demands on education, and adult education is now being considered as an important and essential element in the over-all education system. Governments are realizing that to neglect the education of the adult and youth elements of the population will mean a major obstacle to progress for the next few decades. The coming twenty years are crucial; countries of Asia

cannot afford to let their adult illiterates become a 'lost generation'. It is in fact this generation that contributes to the productive wealth of the country, by providing the labour force and generally contributes to its economic life. Adult education therefore must be geared to economic and social needs; it must, in other words, become 'functional'. Further, this functional aspect should be concentrated in 'priority areas' in economic and social development, and the future manpower needs of the countries.

As a consequence education of adults and out-of-school activities for youth should be an integral part of all educational systems and plans. Informal education is necessary in the countries at all levels of development, as well as for people at all levels of their education, starting from elementary literacy to higher education. On the other hand, education cannot be limited any longer to schools and universities; today educational activities must be carried out by factories, co-operatives, local authorities, radio broadcasts, television, etc. As far as content is concerned, adult education covers very different fields and needs. But the urgency of some problems in Asian countries and the scarcity of means impose the necessity to select priorities and to plan adult education according to needs and possibilities.

Within this wide scope, the specific tasks of adult and youth education can be related to the following immediate problems: the number of illiterates in the region; the number of early school leavers including semi-literates needing further education; the number of young people who by 1980 would still not have had access to primary education and elementary education; the number of adults to be trained to meet manpower requirements at the basic, middle and higher levels; ascertaining the kind of skills required and related in terms of numbers to the National Development Plan.

The programmes of continuing education of adults and out-of-school youth education would, therefore, comprise the following activities: functional literacy; general education programmes following school curriculum and, wherever possible, using school resources; technical and vocational education; civic education.

Functional literacy

The struggle against adult illiteracy is now following two main directions: on the one hand the elaboration of well-defined and realistic national plans and programmes for progressive eradication of illiteracy according to the possibilities, needs and aims of different countries; on the other, implementation of work-oriented pilot literacy

projects carried out through national means with the support of multilateral and bilateral assistance.

The immensity of the problem of literacy, as well as the unsatisfactory results obtained in the past, led individual countries and international conferences to elaborate new strategies and approaches, in order to achieve this tremendous undertaking.

Briefly stated, the essential elements of the new approach to literacy are the following: (a) literacy programmes should be incorporated into and correlated with economic and social development plans; (b) the eradication of illiteracy should start within the categories of population which are highly motivated and which need literacy for their own and the country's benefit; (c) literacy programmes should preferably be linked with economic priorities and carried out in areas undergoing rapid economic expansion; (d) literacy programmes must impart not only reading and writing, but also professional and technical knowledge, thereby leading to a fuller participation of adults in economic and civic life; (e) literacy must be an integral part of the over-all education plan and educational system of each country; (f) the financial needs of functional literacy should be met out of various resources, public and private, as well as provided for in economic investments; (g) the literacy programmes of this new kind should aid in achieving main economic objectives, i.e., the increase in labour productivity, food production, industrialization, social and professional mobility, creation of a new manpower, diversification of the economy.

The vast Asian continent has the largest number of adult illiterates in absolute terms of any world region. In the light of the region's complex and social problems, as well as of the economic and social objectives of Asian countries, illiteracy becomes one of the major obstacles to the development of both natural and human resources in Asia. Although in the past great efforts to combat illiteracy have succeeded in reducing the percentage of illiterates (from 67-71 per cent in 1950 to 53-57 per cent in 1962) in Asian Unesco Member States, there were about 300 million illiterate persons, 15 years of age or more, in Member States in Asia, according to a recent Unesco estimate ('Statistics on Illiteracy', prepared for the Teheran World Congress).

It is obvious that, according to different levels of development, the literacy rate differs widely among the Asian countries. In an attempt to group the countries in three categories, this appears very clearly: (a) in the countries of Group A (Afghanistan, Laos, Nepal) illiteracy percentages of youth and adults are now among the highest in Asia and illiteracy may continue to be a serious problem in 1980; (b) illiteracy also is an acute problem

in Group B (Burma, Cambodia, India, Indonesia, Iran, Mongolia, Pakistan, Republic of Viet-Nam), but here school enrolment is higher than in Group A; (c) the countries in Group C (Ceylon, Republic of China, Republic of Korea, Philippines, Thailand) have a relatively high percentage of children enrolled in schools at the primary level and expect by 1980 to have solved the illiteracy problem to a large extent.

Responsible political, economic and educational authorities are increasingly concerned by the bottleneck illiteracy represents for the development of Asia. At the recent Conference of Ministers of Education and Ministers responsible for Economic Planning (Bangkok, 22-29 November 1965) the delegates adopted recommendations calling upon Member States: 'to actively promote adult literacy within the framework of national plans, priorities and development targets; . . . to include functional literacy programmes in priority schemes of economic and social development, both existing and future'.

It would be difficult to overemphasize the importance of education as a factor of growth. Education is the chief means for improving the quality of labour. The potential economic contribution of a large segment of the population is lost if illiterate workers are unable to reach their production potential without skills, knowledge and adaptability. However, youth education is not sufficient since it omits educational programmes for the existing adult population and for many young people who would reach maturity without the advantage of vocational education or even basic literacy. In contrast with the education of children and young people, the returns from adult literacy may be expected to be forthcoming in a very short time.

There are now two main problems: for economic planners to link literacy to development; for educational policy makers to introduce changes in educational trends and priorities. To achieve this the Economic Commission for Asia and the Far East at its twenty-second session in New Delhi (March 1966) recommended:

1. Development projects in agriculture and industry in areas of mass literacy should incorporate functional literacy components related to the technical and vocational training of workers.
2. Food production, land reform and agricultural modernization programmes in such areas be accompanied by functional literacy projects.
3. Functional literacy projects be established in urban areas where unemployed and unskilled illiterates must be absorbed into industry.
4. Functional literacy projects be linked to secondary and tertiary industry.

5. Plans for education and training make balanced provision for school and out-of-school education for young people and adults.
6. Member States investigate the possibility of directing resources to functional literacy programmes from various ministries, local governments, governmental and non-governmental institutions, public and private enterprises and from funds appropriated to specific development projects.

7. The methods of implementing this new approach to functional literacy must also be examined.

This does not mean that all literacy efforts must necessarily originate from the government (on the contrary many admirable efforts have and can be carried out by voluntary groups), but the co-ordination of all activities should be centrally controlled.

In planning a programme, the following factors must be considered:

1. The mobilization of the teaching force (including both professional and voluntary teachers).
2. The elaboration of appropriate educational methods for teaching adults, of appropriate approaches to adult psychology and to the functional purposes of the programmes.
3. The adaptation of the content of the literacy curricula to various environments and social groups.
4. The production of materials (readers, textbooks, audio-visual aids, etc.).
5. The training of future teachers, planners, administrators, etc.
6. The provision of suitable buildings or other premises for classes.
7. The importance of winning over public opinion to support the programmes through the use of radio, television, newspapers, etc.

It goes without saying that literacy teaching has to be complemented and followed up systematically. Continuing education in Asia, as in other parts of the world, has to meet the urgent needs of adults in an increasingly complex world; it must help forge new links between the heritage of the past and new knowledge techniques and goals. Continuing education has a role in all aspects of social and economic development, including general education programmes, vocational training and re-training, civic education and cultural development.

When considering the formulation and development of education programmes, two fundamental aspects must be considered: (a) that education does not stop with the end of childhood but continues throughout life, and meets a permanent need of individuals and societies; (b) that provision of education for out-of-school youth

as well as adults be 'institutionalized' and become part of national education systems.

General education

As functional literacy programmes develop, there will be vast numbers of new literates for whom further education facilities will have to be provided. In addition, an examination of figures for early school leavers at primary levels show that substantial numbers leave formal schooling with an inadequate, and, in many cases, rudimentary education. Yet it is from these groups that most countries in Asia have to develop their middle-level cadres. The need for a systematic and advanced development of educational facilities for the training of such cadres in urban and rural areas is both necessary and urgent.

In the Asian context where the younger age-groups form a high proportion of the total population and facilities for formal education of the young people are not yet extensive, the patterns of need for education of out-of-school youths and the adults vary as much as their ages.

Over 70 per cent of the population live in rural areas and depend on agricultural operations.

This means that any national plan for out-of-school adult and youth education must have a strong emphasis on improving education in rural areas. This general education in rural areas must be linked to food production targets and general agricultural development, and producers' and consumers' co-operatives.

Not only is it necessary to train the peasant in new techniques and modernization of agriculture, but general education will have to be utilized to bring about a change in his attitudes, knowledge and action.

Schools used for children in the daytime could be mobilized to serve the needs of adults in the evening and school teachers encouraged to help teach the evening classes.

The programmes for general educational purposes (both of a school and out-of-school type) should incorporate not only a knowledge of the mother tongue, general elements of history, geography, science and mathematics, but should also include the elements of professional and technical education as applied to industrial and agricultural areas concerned. Naturally the application would vary from area to area and from country to country depending on needs.

School facilities and curricula used in such extension courses are, however, often insufficient to meet the needs of drop-outs, and many youth organizations sponsor educational programmes which complement school and

extension teaching and even, where the latter are entirely absent, replace them. In localities where school facilities are not available, it is desirable that correspondence education be instituted.

Technical and vocational education

In most developing countries of Asia industrial development coupled with the population explosion has led to the need for a much greater effort in raising productivity.

The trend of economic and social progress in most Asian countries and the generally rapid tempo of developments also demands that special emphasis be placed on the training of adults for technical and vocational education.

Vocational and technical training thus becomes increasingly important in all developing countries of Asia. It is well known that sufficient vocational and training institutes do not exist for school-age young people. Therefore the bulk of this training must be given to adult workers and peasants and young people who have already left school.

To give to such training a functional character, it is very important that patterns of co-ordination must be established between various departments of governments, trade unions, managements, productivity councils and other such organizations. The programme must also, of course, be based on the needs of the workers and related to industries in the areas. As the increase in productivity is of fundamental importance to new industrial development, the necessity of the technical and vocational training must be underlined.

Vocational training of young school-leavers is needed to initiate teenage and young adult farmers and workers into new skills and to up-grade their existing knowledge through industrial training, commercial and management training, farming techniques, and, where possible, through an introduction to technical and scientific concepts and ways of thinking. One particularly underprivileged sector of the adult and youth population is those people who have emigrated from rural to urban areas with little or no formal schooling.

Continuing technical education must, therefore, be developed as an integral function of the education system; schools, vocational training institutes and universities must in turn be orientated to meet this need. It is further suggested that the agricultural institutions both at second and third levels should provide extension education for young adult farmers as one of their essential functions. Many young people and adults may have to

be trained at several periods of their life for new techniques and new functions.

But a serious effort to provide continuous education requires not only the mobilization of institutes and facilities of the education system but also the close co-operation of the ministries of other departments of governments, as well as enterprises, co-operatives, social and professional organizations and institutions.

Civic education

Important though vocational training is, however, it must be complemented by programmes of civic education designed to make fully informed citizens as well as productive workers and farmers. Such education programmes can usefully provide for activities of cultural appreciation and creation, civics education dealing with democratic rights, the history and institutions of the nation and region, and physical education and sport. Methods should be devised in such a way as to adapt programmes to the political and cultural conditions in the countries concerned.

Co-operative ventures are now very much part of the economic pattern in many countries of Asia, and education in co-operative practices, economic significance and day-to-day application is of increasing importance and necessity.

A mention must also be made here of Parent Education. This aspect of education in the Asian context is important for two reasons, firstly, the demographic situation, i.e., the high rate of increase in birth rates throughout Asia and the decision in some countries concerning birth control, and secondly, the preparation of parents so that they are better able to bring up their children both from psychological and health aspects.

These are some important and priority aspects of adult and out-of-school education. There are many others, and all of them should be considered in conformity with the conditions, particularities, traditions and actual needs of every country.

Education of girls and women

The achievement of the targets of enrolment envisaged in the projections up to 1980, particularly at the first level of education, will be possible only if the rate of enrolment increase for girls is stepped up sharply in the coming years. In countries of Groups A and B, the majority of children to be enrolled under the expansion programmes are girls. The one factor that above all will determine the

TABLE 35. Female pupils by level of education as a percentage of total enrolment (around 1964)

Countries	First level	Second level	Third level
Group A	18	19	11
Group B	36	27	17
Group C	47	40	42

success of the expansion programme is the speed and effectiveness with which the existing wide disparity between the enrolments of boys and girls is narrowed and ultimately eliminated. Table 35 shows the position around 1964.¹

The disparity in enrolments is even more marked in the rural areas, and it is here, therefore, that the main direction of effort in equalizing access to education must lie in the immediate future.

The causes of the slow progress of girls and women in Asia are both social and economic. In a number of countries, customs and traditions to some extent come in the way of rapid progress. Family poverty and use of child labour make the problem even more serious. The effects of these factors are particularly felt at the second and third levels.

In terms of national development, any marked lag in girls' schooling is a matter for serious concern. Since every State needs the contribution of all its citizens, men and women, the latter must be fully equipped through education to share in the life and progress of their country. The fact that most girls are destined for marriage makes it specially important to raise their educational levels, because of their influence in the home, which is the immediate environment of both the current and coming generation of workers. The relationship between increased education for girls and successful family planning has also to be considered. Although the links are not yet fully understood, there seems good reason to believe that they are positive.

Apart from the need to educate women for their own sake and the question of instructing future wives and mothers, it is necessary to bring girls as fully as possible into the school system in order to train them for future technical and professional careers.²

Since the backwardness of girls' education arises from social and economic causes, the remedial action must necessarily include social and economic measures.

1. Data based on information obtained from national publications, from Unesco publications and from the 'Reports of the Unesco Regional Advisory Teams for Educational Planning in Asia'.
2. See II.10 of *Recommendations concerning Technical and Vocational Education* adopted by the General Conference of Unesco at its twelfth session (November-December 1962).

High priority must be given to educating public opinion. This is essentially a programme of adult education which should enlist the support of parent-teacher associations, voluntary organizations of women workers and educational institutions at all levels. The experience in developing countries has shown repeatedly that a movement which is able to fire the imagination of the people can surmount social and traditional barriers.

Universal compulsory education for girls

Considering the economic and social problems involved in a programme of universalizing education for girls, some practical measures of the type suggested below may be helpful in some countries of the region.

Special incentives. Even where primary education is free, parents have to provide books, stationery and suitable clothing. A recent survey in one of the countries in the region showed that parents could not send children to school or withdrew them prematurely for reasons which included lack of proper clothing. Special concessions in this regard would therefore be needed for girls from poor families. They could be in the form of books, stationery and school uniform.

Special staff in schools. In a number of developing countries provision on the staff of 'school mothers' has been very helpful in bringing girls to school in rural areas. They chaperon the girls to school and look after them while they are there. They also help in simple school tasks, such as personal care of the children, beautifying the school environment and the like.

Separate schools. Though co-education at the first level is desirable and necessary, during the transitional period, separate schools for girls should be provided where there is a demand for such schools.

Special amenities. Girls often are unable to go to school because they are required to look after the younger children in the family when the parents are at work. Some countries in the region have experimented successfully with providing crèches in schools in the rural areas so that the infants are looked after while the sister is at study. Furthermore, where schools are co-educational, it is important that they should be equipped for the personal needs of girls.

Second-level education

This stage is important because it provides personnel for intermediate levels of occupation in government and other services—teaching, agriculture, industry, health and social welfare, distributive trades and offices. It also

prepares the girls for studies at a higher level. To facilitate increase in the enrolment of girls at the second level, the following steps are recommended: (a) establishment of similar separate institutions for girls where needed; (b) provision of student residences for girls to enable those coming from rural areas to make use of educational facilities; (c) provision of scholarships and fee concessions; (d) if the school caters for a limited area, provision of transport facilities; (e) part-time courses to enable those whose duties at home do not permit full-time attendance to qualify for the secondary school-leaving examination; (f) interchange of staff in co-educational institutions and appointment of women as teachers and heads of co-educational institutions; (g) family education, especially for obtaining the co-operation of parents in the education of their daughters.

Technical education at the second level is of paramount importance for girls since it equips them with a means of earning a living and provides the country with much needed qualified personnel. The opportunities offered in principle and in fact to girls should be varied, and the training should be of high quality to ensure adequate vocational preparation. The following measures are required: (a) action to inform the public and the girls themselves of the opportunities for technical training and the new job opportunities open to women; (b) educational and vocational guidance to detect talent and orient the pupils towards various types of technical education; (c) improvement in the equipment of girls' technical schools and development of new sections preparing for a variety of jobs; (d) wherever feasible, opening of all sections of boys' technical schools to girls also; (e) provision of residence for girls.

Higher education

The role of higher education in preparing high-level manpower and leadership is as important in regard to the education of girls as it is for boys. It is particularly significant in the social task of training public opinion to accept and expect an extension of woman's role in all spheres of national life. Besides, it is the main source of supply of women teachers for the schools.

Table 36 gives for the countries in the region the distribution of female students by branch of study at the third level. The imbalances are evident.

It is necessary that girls should be encouraged to enter all fields of study in universities, including professional and scientific. In this connexion, it needs to be emphasized that courses in home economics should be so organized that in addition to preparing women for home making,

TABLE 36. Percentage of female students by branch of study at the third level, around 1963

Countries	Humanities	Education	Fine arts	Law	Social sciences	Natural sciences	Engineering	Medicine	Agriculture
Group A	...	...	...	...	...	...	...	...	...
Group B ¹	25	32	11	5	2	12	1	21	...
Group C	44	75	41	9	39	32	5	53	0.5 11

1. Data for Indonesia and Mongolia not available.

Source. Based on data obtained from the *Unesco Statistical Yearbook, 1964*, Paris, Unesco, 1966.

they also prepare them for vocations related to areas of specialization in home economics.

To facilitate the education of a large number of girls at this level, the following measures are suggested.

1. There are at present two practices prevalent with regard to admission of girls to higher education, particularly to medical and other professional courses. The first one reserves for them a few seats and the second provides for an open admission to both boys and girls. Since the first denies admission to a large number of qualified girls, particularly in the professional courses, open admission should be the practice in all institutions of higher education.
2. There should be liberal provision of scholarships for girls.
3. In many situations the system of part-time education is more suited to girls and development in this direction is particularly desirable.
4. The present status and special problems of education of girls and women in the countries of the region should form the subject of research and study. Funds should be set apart for this, and selected institutions for higher education should be encouraged to undertake these studies.

Curriculum

The curriculum for boys and girls will be the same during the years of compulsory education. It will be necessary to provide in the later grades a course in pre-vocational training along with general education for pupils who show no interest in a purely academic type of education and who for this as well as economic reasons terminate their studies at the end of the period of compulsion. At the secondary and higher education level, boys and girls should have the same choice of subjects so that each can take those for which he or she has the aptitude.

It will be advantageous to include education as a subject at upper secondary level to facilitate the training of teachers for the first level of education. Education with

reference to pre-primary teaching will be another subject of increasing utility in the years to come.

Preparation of women teachers

Table 37 gives the percentage of women teachers in the total teaching force in the countries of the region. The correlation between a low percentage of women teachers and the percentage of girls in school is strikingly evident. The expansion of girls' education depends on preparing an adequate supply of women teachers. Special measures will therefore be necessary to attract girls with required qualifications to enter the teaching profession and to supplement these with other emergency measures to build up an adequate supply. The problem of rural schools would require particular attention because the shortage is most serious in them.

The following are some of the measures that may be considered:

1. Additional training institutions for women teachers should be set up where there is a shortage and as far as possible they may be located in rural areas.
2. Wherever feasible, and particularly in rural areas, the training schools for primary school teachers and girls' secondary schools could be developed together as combined institutions.
3. The training of teachers' wives as teachers or school mothers should be encouraged.
4. To enable women with children to be in residence in hostels and undergo training in teacher-training

TABLE 37. Female teachers as a percentage of total number of teachers (around 1963)

Countries	First level	Second level	Third level
Group A	10	13	—
Group B	20	25	13
Group C	47	34	30

Source. Data are estimates based on information obtained from national and Unesco publications.

institutions, provision would be needed for the care of their children during this period.

In order to increase the supply of women teachers for rural areas, the following measures may be necessary:

1. In employing women teachers in rural areas preference should be given to persons from these areas whenever possible.
2. In selecting candidates for admission to training institutions, girls from rural areas should be given preference.
3. Scholarships should be instituted for girls from rural areas to enable them to undergo training without any further financial assistance from home.
4. The maximum age limit of entry into service should be relaxed as much as possible in the case of women teachers and the age of retirement should be extended.
5. Condensed courses in general education should be organized to enable women to qualify for admission to teacher-training institutions.
6. Part-time courses for the preparation of women teachers should be organized.
7. Part-time employment of women teachers should be encouraged to enable women to manage their responsibilities at home as well as to do some teaching work.

Educational administration

The existing machinery for educational administration in many countries of the region may not be able to cope with the next tasks involved and the new measures needed to give the education of girls and women high priority as a special and major problem. Among the additions and adjustments needed in the educational administrative machinery to meet the new requirements, the following deserve mention.

1. The organization of a special division handled by an officer of appropriate status charged with the formulation and implementation of programmes of education for girls and women.
2. The formation of a national council composed of important voluntary organizations to advise on the steps to be taken for expanding the education of girls and women, to assist in implementation of programmes and to review their progress from time to time. This council should be a non-governmental agency and should be supported by an adequate secretariat.
3. Women officers should be employed as educational administrators and supervisors in larger numbers to bring about parity between men and women officers in educational administration.

General, vocational and technical education (including agricultural education)

The scale on which development of vocational and technical education (agricultural, industrial, commercial and other services) is projected in the Model will call for an exacting, and almost unprecedented, measure of effort. Even making allowance for the fact that not all the increase will take place in institutional training, and that it includes also other forms of training (e.g., in-plant training) an increase of the order envisaged will necessitate, as is in fact contemplated in the Model, creation of new institutions and development of new programmes.

The projections have been made taking account of the likely and desirable changes in the composition and skills of the labour force during the years ahead, postulating the maximum increase that is necessary if the existing critical deficiencies are to be corrected and the economy is to be served towards an accelerated rate of growth. Furthermore, the Model provides for increasing the levels at which vocational education is given as the economy becomes technologically more advanced.

While the need for the supply of skilled personnel to the economy is undoubtedly an important factor, other considerations, no less important, influence the forms which programmes of vocational and technical education may take. Of these, the most important is the link between 'general' education and vocational education. In the context of the changing forms of technology, the skills most in need are adaptability and flexibility. The fact that in the developing countries modern technologies must co-exist with 'intermediate' and even traditional technologies does not reduce the need for adaptability and trainability. Vocational and technical education is therefore to be conceived as one of the forms of education, and general education and vocational education as aspects of the same educational process. This approach has two practical implications in the Model; first in determining the stage at which specialization in this form should begin, and secondly in the provision in general education for pre-vocational learning experiences.

In the earlier phase of the first level of education, the elements of work experiences presented in a form appropriate to the stage of development of the pupils can contribute significantly to enriching the school programme, the cultivation of a positive attitude to manual labour and laying the foundation of organized habits of work. The curricula should be so designed as to provide a sound general education linked at the same time to the needs of the local community and environment. In Grades VI and VII (corresponding to ages 12 and 13) it should be

possible to introduce the pupils more systematically, in schools as well as in homes, to practical experiences connected with home economics, farming operations and workshop, using these experiences as a medium for their general education. Throughout, the programme should be linked to science education.

At the lower stage of second level (Grades VIII to X) the practical work programme centred round farming operations, workshop practices and home management should continue as part of the general education for all pupils. This interlacing of general education with genuine elements of technical education is one of the fundamental changes that is required to be made for reorienting school education generally and in particular education at the second level. In addition, it will be necessary to provide a greater element of vocational training for a proportion of pupils who are not likely to continue their studies beyond this stage. Though more markedly vocational in intent, the programme for these pupils will contain a substantial element of general education including science and mathematics, and will prepare them to enter the world of work either directly or through further intensive training of the type provided by apprenticeship schemes, etc. With the exploratory experiences that pupils would have had in the world of work, as part of their general education, they would be in a better position to make their educational and vocational choice at the second level. Considering the close relationship of general education and vocation-oriented education at this level, it will be desirable that as far as practical these forms of education are provided in the same institution.

The interlinking of general education and vocation-oriented education provides one of the essential elements in the diversification of second-level education. With the large increase in enrolments that will take place in the coming years, the schools of the region, in the 1980s, will represent a significantly wider range of differences amongst the pupils than at present—differences in general and special abilities, aptitude and interests, needs and socio-economic backgrounds. The education system as a whole, particularly at the second and third levels, as well as the school programmes, will have to be greatly diversified to meet these varying needs in the form of new types of institution and by the provision of courses adapted to the needs of those who will terminate their formal education at that stage and wish to acquire the qualifications they will need to earn their living.

The distribution of pupils at the lower second stage between those who will enter the vocationally oriented terminal programmes and those who will continue in general education is likely to differ according to the stage

of economic development reached by a country. The Model assumes that in Groups A and B countries, this stage will form an important source of supply of artisans, craftsmen, junior agriculture technicians and other categories of skilled workers and para-medical personnel. In countries of Group C a shift to the next higher level qualification will begin to take place and the lower stage of secondary education will diminish relatively in importance as a source of supply.

The critical need in all countries of the region is for the development of 'technician' level education, that is, of persons 'requiring a knowledge of technology and related sciences between that of a skilled worker and that of an engineer or technologist'. This category comprises not only industrial but also agricultural, commercial and other services. In the Model, specialized training of technicians is envisaged at two levels: at the higher stage of second level after ten years' schooling, and at the third level after twelve years' schooling, the latter being in institutions other than universities (e.g., polytechnics, specialized junior colleges, etc.). The institutional structure for the training of specialized personnel at 'technician' level in the region is at present wholly inadequate and its development and expansion would therefore need special effort.

There are two areas, closely allied to the subject under discussion which will need special attention and development. The first is vocational guidance. It forms an important link between the choice of individual pupils and the present and future needs that public policy seeks to meet. Vocational guidance is therefore essential, and should be designed on the one hand for promoting in the pupils a better understanding of their own abilities and interests, and on the other hand for disseminating information about the occupations open to them and the qualifications required. Vocational guidance services are inadequately developed in most countries of the region. Training facilities for forming the cadres are insufficient and the tools of guidance almost non-existent. A considerable effort in this direction has therefore to be made in order to ensure that diversification of the educational programmes and development of guidance services go hand in hand.

The second area is that of science education, which is considered in greater detail elsewhere. It is enough to mention here that the effectiveness of science teaching will gain immeasurably by inclusion of certain elements of technical education and workshop practice in the education of all pupils up to Grade X. At the same time, for a good programme of vocational and technical education, particularly those forms which are related to agricul-

ture and industry, a firm foundation in the scientific subjects including mathematics is indispensable.

A programme for the development of vocational and technical forms of education of the magnitude implicit in the Model and likely to influence the entire education system in a fundamental way calls for careful preplanning and effective implementation. The basic principles are contained in the *Recommendations concerning Technical and Vocational Education* adopted by the General Conference of Unesco at its twelfth session (November–December 1962), which provide the guidelines for planning, administration, organization, programme of study, teaching staff, teaching methods, evaluation and research.

The following suggestions are made to emphasize some of the possible priorities.

1. A long-term projection is necessarily in terms of gross numbers. In the field of vocational and technical education there is need to break these down into detailed requirements for different occupations through short-term plans related to over-all economic development plans. It is essential, therefore, that studies in manpower supply and requirements, including assessment of existing facilities, institutional and others, should be developed on a priority basis as part of educational planning.
2. Considering the links of this form of education with other sectors of national life, it is necessary that a planning and development council for technical education or similar appropriate agency should be established to develop and co-ordinate all programmes of vocational and technical education in association with industrial, agricultural and commercial sectors.
3. The supply of teachers for vocational and technical institutions is likely to prove a serious bottleneck unless planned measures for their training are taken in advance. First priority should therefore be accorded to the establishment of institutions for the training of teachers, the programme of expansion being phased according to the available output of teachers. Training resources can be extended by opportunities for training abroad and development of institutions at regional or sub-regional levels in Asia. It will also be desirable to make elements of pedagogy an essential part of all technical education at the third level.
4. Another important area of need is the production of instructional materials in the national languages. Translation and adaptation of foreign books may meet the need partially, but the major part of the work for producing instructional materials suited to local conditions will, however, have to be done at the national level. For this purpose the resources of personnel,

national and international, will need to be organized systematically, and teacher-training institutions and institutions of higher learning and research involved closely in the task.

5. The supply of equipment for workshops and laboratories, which accounts for 30–40 per cent of the capital costs in vocational and technical education, is likely to be another obstacle. In this area, international assistance will be critically important. In addition, the training establishments should be organized as production centres also, which will increase the effectiveness of the training programmes and create a useful supplementary source of supply of inexpensive tools for lower and higher secondary schools. Furthermore, there is considerable scope, as yet unexplored, for countries in the region to collaborate, with international support, in establishing regional or sub-regional designing and production centres.
6. Vocational and technical schools at the second level have generally been handicapped by shortage of staff and equipment, and have not secured parity of esteem with other institutions. It is emphasized therefore that the vocational education programme, whether located in an institution of general education or separately, should be developed in a manner that will remove their existing disadvantages and invest them with a status comparable with other forms of education.

Agriculture education

In reviewing the economic scene in the region in Chapter 1, reference was made to the relatively slower rate of growth of the agricultural sector with the result that it tended to depress the growth of over-all national product. In the context of rapidly increasing populations, the agricultural sector has become a matter of vital concern. It has been observed that the gap between developing and developed countries in product per worker in agriculture is much wider than in product per worker in the industrial and other sectors. Broadly speaking, in countries in Group B, 72 per cent of the labour force produces about 48 per cent of GNP and in Group C, 68 per cent produce 41 per cent of GNP.

Industrialization in the countries which are now developed was preceded and facilitated by profound changes in agricultural techniques and productivity. In most countries in the region, a similar revolution in agriculture has not yet taken place. A marked rise in the agricultural productivity is an essential precondition of all-round economic development.

Agricultural productivity is dependent on a variety of factors, both economic and social-psychological—size of farm, availability of strategic inputs, agricultural techniques, application of research findings in the field, institutional structure and responsiveness to change, and so on. Linked to productivity is also the problem of enriching rural life. Agriculture is not only an occupation; it is also a way of life. Accordingly the principal obstacles to increasing production are not only the lag in the application of known techniques but are also educational, social and cultural. A rural environment that is gradually becoming more and more impoverished is less responsive to the challenge of change.¹

The vital contribution of education to agricultural development lies mainly through the 'human factor'. More specifically, there are four areas which link education to agricultural development; firstly, fostering in young people, men and women alike, who pass through the education system an understanding and appreciation of the agricultural way of life; secondly, preparation of the skilled manpower needed for agricultural development; thirdly, the function of educational institutions in rural areas to provide adult education to the community; and fourthly, development of research in agricultural sciences.

Agricultural education, it must be emphasized, should not be planned as an education 'apart' but should be fully integrated into the national system of education and also in the national social economic development plan.²

The expansion of education on the scale envisaged in the Model would imply that from the next decade an increasing number of young people entering the working force, in the rural and the urban sectors, would have passed through the school system. This extends in a striking way the range of influence that the education system can exercise.

In discussing technical and vocational education, it has been strongly urged that elements of work experience should be integrated into the curriculum at the first level. Where the environment is rural, this should appropriately take the form mainly of activities and experiences centred round agriculture including simple operations connected with the maintenance and repairing of tools and equipment. The aim is not a detailed probing into techniques and methods of agriculture or skill training but a broad study, understanding, and appreciation of the processes by which the community lives.³

It has further been suggested that at the lower second level, work experience programmes should continue as an essential part of general education of all pupils, and that in rural areas it should be based on farming operations.

It is at the second and third levels that specialized

personnel for agricultural development are to be prepared by the education system to meet the needs of those who will enter agricultural occupations as well as the requirements of agriculture extension services and other skilled jobs.

The greatest need in the countries of the region is for extension services on a large scale, manned by fully qualified people, trained in both the technical and social aspects of their work. 'Extension' is the link between improved practices developed through research and their diffusion for application by the mass of the agricultural population. The requirements for extension workers are therefore determined, on the one hand, by the number of producers in the agriculture sector and, on the other hand, by the range of occupations that the pattern of agricultural production comprises in an area. Considering the limited scale on which extension services have so far developed in most countries in the region, a major task lies ahead in preparing the technical personnel required for the purpose.

By and large, agriculture schools and colleges in the region have not so far been able to provide for the needs of prospective farmers. The graduates have continued to look to government service rather than farming for future career.⁴ The projected development of education up to 1980 assumes a much larger percentage of pupils staying on in school beyond the period of compulsory education. Consequently, there will be greater need than has made itself felt at present to provide for pupils who would terminate their education at this stage and enter life.

Agriculture education at the second level would comprise preparation for a large range of technical specialties such as agricultural teachers, advisers and assistant advisers in extension services and agricultural credit organizations, specialized farmers, farm mechanics, farm managers, instructors, field laboratory assistants in research or the agricultural industries, and so on. Vocational agriculture schools at the second level should include general education and particularly give a good grounding in the scientific subjects. Although organization and curricula are important considerations, perhaps most important of all in vocational education for agriculture must be the emphasis upon work on the land, and on the structure and needs of rural life. There

1. *Education and Agricultural Development*, Paris, Unesco, 1963 (Basic Study No. 15).

2. L. Malassis, *Economic Development and the Programming of Rural Education*, Paris, Unesco, 1966.

3. WCOTP, *Education Panorama*, Vol. VII, No. 4, 1965.

4. C.W. Chang, *Present Status of Agricultural Development in Asia and the Far East*, Rome, Food and Agriculture Organization, 1961.

schools, as 'nature study', 'environmental activities', etc., and takes 5 to 15 per cent of curriculum time. At the second level two different patterns generally prevail; in some countries general science is one of the required subjects, while in other countries science is one of the optional subjects. It was estimated for one of the larger countries in the region that nearly 60 per cent of the pupils at the second level had no access to science education in any adequate form. It is possible that the picture for the region as a whole may not be substantially different.

For developing an effective programme of science education, it is essential to build it up from the foundations, that is, from the first grade. In advanced countries, the child grows up in an environment abundantly supplied with useful examples of the application of science and technology to his daily life. From this environment he absorbs many scientific ideas. In developing countries the opportunities for the child to acquire these scientific concepts may be fewer, and are certainly different. He is less likely to be encouraged to ask questions and to have an acquiring attitude of mind. Moreover, he often lacks the opportunity to play with toys which can help him both to appreciate scientific ideas in a concrete way and to develop manipulative skills. It is the school in the developing country which must foster the outlook and provide the experiences which, to a much greater extent, would have been automatically supplied by the environment in an advanced country. Systematic studies have shown that the earlier the educational process starts the more fruitful it is. The child should have the opportunity to utilize such things as hand tools and scientific toys from the beginning of the primary school course. He should also be encouraged to be inquiring and observant, and to interpret his experiences in scientific terms. Furthermore, schools at the first level are concerned not only with children who may proceed to higher educational levels. Most of the children will terminate their education at this stage, and what they learn here is all that they will have as preparation for their adult responsibilities. The level of scientific literacy in the future adult population depends to a considerable extent on what these children go out with.

Different patterns of science education prevail at the second level in different national systems. In some, scientific subjects such as physics, chemistry, biology and mathematics are required subjects for all pupils throughout the second level. In others, science may be taught as 'general science' to all pupils up to a certain grade and in the higher reaches of second level it is offered in a more specialized form only to those pupils who elect the scientific courses. From the point of view of programming for the development of science education in a school system

in the immediate years ahead, a policy decision on the pattern to be adopted is of vital importance. In view of the strategic place of second-level education in a national system of education, it is suggested that in the countries of the region, science should be a required subject up to at least Grade X, to enable all pupils to get a systematic introduction to the methodology of science and widen their understanding of its impact on society and on the individual, on productive processes as well as on individual living. Pupils who enter technical and vocational courses would need a basic grounding in the scientific subjects as much as those who might terminate their formal education at this stage and go out into life. Where a national system of education provides for 'elective' courses in more specialized forms, it would be appropriate to offer the choice in Grade XI rather than earlier, so that pupils who elect the science courses would proceed to them with a wider view of the cultural aspects of science and of the interrelationship of different branches of science. It is furthermore desirable that pupils who elect 'non-science' courses of studies should not be completely isolated from the scientific influence. This could be provided through specially devised courses as part of general education—'science for the non-scientist', which would include elements of the history of science.

At the third level the development of science education, on the scale envisaged in the Model, in university institutions and in technical and professional education for which science is essential, would depend on the output of science students from the second level. Lack of adequate provision for science and mathematics teaching at the second level would become a serious bottleneck. Where the 'elective' system prevails special care in planning would be needed to ensure that the output of second-level schools is adequate to meet these and other diverse needs.

The approach to the teaching of science and mathematics has been undergoing revolutionary changes in the past few years. No other curriculum area has witnessed changes of equally far-reaching importance. This is not surprising. Accelerating growth is the characteristic of scientific knowledge. It is estimated that the body of scientific knowledge is doubling every 10 to 15 years. The current revolution in science teaching arose from the recognition that what was being taught in schools was much behind the times, even in the advanced countries. This has led to the introduction of modern curricula devised after careful experimentation by research teams of psychologists, educators and scientists. Already a considerable and rapidly growing body of international experience is available on the modern approach to mathe-

matics and science teaching.¹ It has important bearings for developing countries which are reorganizing and extending their facilities for science teaching. The consequences of a wrong start may adversely affect their educational development for many years. They are in a position in fact to take advantage of the revolutionary changes taking place in science teaching and adapt them to their particular needs or evolve their own programmes.

There are three aspects of the new programmes which deserve mention. First, the development of science education has to be carried out at all stages of education in an integrated manner, from the primary to the higher level. Secondly, it must involve not only teachers but also active scientists from universities and research institutions. Thirdly, the new programme is not a mere exercise in preparing another syllabus. It is an integration of all tools of teaching and learning science—training and retraining of teachers, textbooks, supplementary books for students and guidebooks for teachers, laboratory equipment and teaching aids, from simple charts and models to films and programmed instruction.

The countries of the region face four major tasks in developing a more adequate system of science education, namely, raising the quantitative level of science teaching through expansion of facilities at all levels of education, and provision and improvement of physical facilities—laboratory equipment and other instructional aids—and raising the qualitative level of what is taught and how it is taught by provision and improvement of the teaching staff, and reorganization of the substantive course content to assure scientific validity and in a form designed to maximize learning experiences.

Fundamentally, there are two keys to accelerating the development of science education: first, a radical revision of the content of a science and of the approach by which a student is helped to grasp this content; second, training of science teachers in much larger numbers and in ways which prepare them to handle the new materials and which prepare them to handle the new materials and approaches. From surveys carried out in some countries of the region, it would appear that nearly 60 per cent of the teachers in primary schools had little or no background of science. At the second level also there is an acute shortage of science teachers (in one country, the authorized strength is reported to be short by 40 per cent). Besides, most of those teaching science are inadequately prepared. In one of the advanced countries of the region, a survey made in 1957 revealed that 76 per cent of the teachers had only three units in natural science. Inadequacy of teaching staff forces a slowing down of the pace of expansion in science education, which in turn affects the supply of future teachers, and thus a vicious circle is set

up. Increase in the supply of science teachers is therefore of crucial importance.

At the first level, systematic in-service training of teachers during vacations, follow-up through correspondence courses (in combination, wherever possible, with radio and television programmes for teachers) and continuous guidance by qualified supervisors will contribute substantially to improving science teaching. A number of countries in the region have in recent years organized with success summer institutes for secondary school science teachers. The technique will be equally useful for primary school teachers. It is, however, important to stress that the in-service training should be part of an integrated plan for science education, and the course, content, and methods used in the retraining of teachers should be designed to promote the kind of skills and attitudes that the teacher in turn is expected to foster in the pupils. Along with measures for in-service training of teachers, the pre-service courses for preparing first-level teachers may have to be reorganized to give to all prospective teachers an adequate mastery of the subject, content and methods of teaching science and mathematics in the primary grades.

Science education at the second level presents more difficult problems. It is estimated that roughly 25 per cent of the teaching force at the second level should comprise science and mathematics teachers for the kind of expansion that has been suggested in the earlier paragraphs. In the last analysis, the problem can be solved only by increasing greatly the output of science graduates from universities and teacher-training institutions. In view of the urgency that attaches to this problem, some countries in the region are establishing institutions, in collaboration with universities, devoted mainly to preparing science and mathematics teachers for secondary schools. As suggested earlier for technical and vocational education, it might also be desirable to consider whether some elements of pedagogy could be included in the education of all science students at the third level. In order to fill the present gaps between the needs and the available resources it would be necessary also to take short-term and emergency measures such as: raising the retirement age of science and mathematics teachers; encouraging the return to teaching of married women and those who are retired from the profession; part-time employment of persons who are not teachers but who possess special scientific qualifications (for example, doctors, pharmacists,

1. Unesco in recent years has undertaken regional pilot projects on new approaches, methods and techniques of teaching science. One of the pilot projects is in chemistry and has originated in Asia.

engineers, etc.); provision of short courses and part-time courses of training for such specialists; use of special courses provided by television or radio and extensive use of visual methods in general; systematic use of science advisers to teachers; development of special study guides for teachers.

In order to free the teachers from routine duties and enable them to give more time to class teaching, the provision of laboratory assistance is of particular importance in promoting good science education.

While the pace of expansion must necessarily be governed by availability of teachers, the task of modernizing the teaching of science and mathematics at the second level has to be taken in hand urgently and carried out through existing personnel resources. In this context, it is essential that the reorganized programme must be developed, through suitable techniques of experimental trials, as an integrated whole, covering the restructuring of science curriculum, preparation of textbooks and other instructional materials, laboratory work and equipment and evaluation procedures. The retraining of teachers through summer institutes, follow-up correspondence courses and other forms of in-service education should take place within the framework of a reorganized programme rather than as an isolated activity.

The new approach to the teaching of science places primary emphasis on learning as an experience in inquiry and discovery, on the experimental method and presenting sciences as the scientist does it. The laboratory is therefore the main tool of learning; it is the scientist's workshop.

Laboratory facilities do not have to be lavish to be adequate. They are to be judged by their instructional value; often a simple equipment is more helpful in leading the student to the comprehension of fundamental concepts than an elaborate machine.

At the first level, the need for formal equipment is the minimum and does not extend beyond such instruments as measuring cylinders, balances, charts and models and the like. Using the resources of the environment and improvisation are more suited to the activity-centred methods of teaching at this stage. The chief requirement, however, is that the teachers should be trained to set up simple experiments and to use these methods creatively.

At the second level, equipment would be needed for individual experimental work by the pupils and also for demonstration, though teacher-student-made equipment would still be a valuable adjunct to the laboratory. It is also important to provide school workshops which are useful both for manual training and for making and repairing science equipment. Experience in many countries has proved that there is a wide scope for redesigning much

of school science equipment to enhance its instructional value and reduce costs. Certain countries in the region have established central science equipment workshops to improve the traditional equipment and standardize it. Wider exchange of these experiences is very desirable.

A great deal of what is ordinarily called demonstration can be provided by films and other visual devices, constructed around experiments which would be too expensive or time-consuming if set up in the laboratory. The use of these media in science needs to be systematically developed.

The new technology of teaching has found its fullest and most fruitful application in the new programmes of science education. Improvement of science teaching is thus likely to influence other areas of curriculum also, and become a fertile starting point for all-round change and improvement.

It is not without significance that the movement for modernizing school science has given considerable importance to reorganizing the textbook and preparing laboratory guidebooks and other supplementary materials. In the developing countries, the textbook is an important, and almost indispensable, tool of learning. A shortage of textbooks of adequate quality is a major factor preventing expansion and improvement of science education. The reorganization of textbooks therefore should receive high priority so that they may serve as a link between the classroom and the laboratory and also as an effective means of self-directed study by the pupils.

The reorganization of science education which is of such crucial, vital and immediate concern to Asian countries is not a once-and-for-all task; one should rather visualize it as a process that will go on for a long time through successive stages and be effected by successive approximations. The secondary schools today have to deal with children who have been taught through the traditional methods in the primary schools, just as the universities have the students as they come out of the secondary schools. A quite different situation will be brought about once changes are introduced in the primary and secondary schools and pupils come out with a different background. Once the initial impulse is given, each successive change is easier to make.

The following suggestions are put forth for consideration as providing a possible framework for further action:

1. A detailed phased plan for the expansion and reorganization of science education at all levels should be prepared by each Member State with the object of:
(a) providing facilities for science teaching to all pupils during at least the first ten years of their schooling in a form suited to their environment and their individual

needs and capacity, it being recognized that science is an integral part of general education; (b) providing opportunities to an adequate proportion of pupils to study science and mathematics in greater depth and prepare themselves for careers in science and technology; (c) expanding facilities for science education and research in the universities; and (d) strengthening and expanding teacher training both pre-service and in-service, and research in science teaching in the universities and teacher-training institutions.

2. It would be desirable to form a National Science Education Committee which should include scientists from universities and scientific bodies, specialists in psychology, teachers and representatives of industries, and serve as the focal point for the efforts to expand and strengthen science education. Working at policy level, its functions would include: (a) carrying out surveys to assess the present position of science teaching in the country; (b) evolving modern curricula course materials, textbooks and teaching materials; (c) organizing training of science teachers and supervisors including in-service training; (d) organizing the designing and production of improved and inexpensive equipment; (e) evolving improved examination and evaluation procedures adapted to the new objectives of teaching science and mathematics; (f) organizing experimental schools and classes to try out new methods and materials; (g) preparing long- and short-term plans for the integrated development of science education.
3. Science and mathematics curricula, teaching methods and materials should be modernized under the guidance of the National Science Education Committee. The new programmes should be closely integrated as regards both the needs of science teaching at different levels in relation to general education and the re-organizing of the substantive content courses, textbooks, guidebooks, teaching aids, science equipment and material, and the pre-service and in-service training of teachers. The detailed plan suggested at (1) above would have as its primary objective the implementation of these new programmes. At the operational level it would be desirable to establish a national centre for the promotion of science education. It would bring together scientists, educational psychologists, and experienced teachers in a concerted effort to undertake careful analyses and reorganization of the content of each basic science, develop laboratory experiments that are essentially student-conducted inquiries, provide school teachers with opportunities for experiments in new ways of science teaching, study problems connected with laboratory equipment and buildings, organize the designing and manufacturing of standardized equipment and teaching aids, and prepare and publish scientific instructional materials.
4. Within the Ministries of Education and subordinate local bodies, the administrative organization should be strengthened, and for this purpose it may be desirable to establish a central department of science education manned by fully qualified people representing different specializations. It will also be the secretariat of the national committee. Specialist science supervisors should be appointed to guide the teachers in the schools and make available to them information about improved techniques.
5. Science documentation centres should be established for the collection and diffusion of information relating to science education and they should, among others, serve schools, training institutions and supervisory personnel.

Appendixes

Appendix A

Population projections

Population projections for the countries of the region are available from national and international sources. The United Nations published in 1958 and 1959 detailed estimates of future population by age and sex for Asian countries.¹ Recently, a revised set of projections of the total population of the world by regions and countries, taking into account the results of recent censuses, has been published.² These estimates are provisional and do not present data distributed by sex and age-groups. The Population Commission of the United Nations, at its twelfth session (4 to 15 February 1963), recognized that 'only projections carried out by each government for itself could fully satisfy the needs for these indispensable aids to national planning and policy decisions'. The commission also recognized that 'it was not the aim of projections made by the staff of the United Nations or regional demographic centres to supplant such work at the national level'.

For the purposes of this study, preference has been given to national projections since the revised United Nations projections do not provide data for individual countries by age and sex groups. The national population projections are based mainly on estimates calculated by government bodies, research institutions or individual experts in the countries concerned. Where national estimates were not available, projections worked out by the Unesco Regional Advisory Teams for educational planning have been adopted (i.e., Afghanistan, Cambodia, Laos, Mongolia, Republic of Viet-Nam). For a few areas (Sabah, Sarawak, Singapore) the projections used were derived from both the national estimates and the projections prepared by the secretariat of United Nations in 1959.

Satisfactory data on the levels of fertility and mortality are lacking for several areas in the region. Population censuses have not been undertaken in some of the areas and, in some instances, the most recent were too remote in the past to enable very reliable projections to be made.

Where national projections were available for two or several variant population trends, the projections selected were those considered by the countries themselves as the most reasonable ones which are being used by the governments for planning purposes, or the projections that seemed most plausible taking into account past trends and consistent with the assumptions accepted for the United Nations projections.

The projections used in this study refer to the mid-year of calendar years at the end of quinquennial periods from 1960 to 1980. Many of available national population projections for quinquennial periods do not refer to the period 1960-80. Where the dates of the calculation differed from the mid-year dates 1960, 1965 and so forth by less than one year, total population figures were interpolated for the required mid-year dates by the geometric increase formula and the results distributed by age and sex according to the distribution shown for the nearest year in the national projections. Some of the available projections were calculated for dates such as 1957 and 1962; these were also interpolated (geometrically for totals and arithmetically for populations in the five-year age-groups) so as to obtain the corresponding mid-year estimates for 1960 and subsequent dates at five-year intervals. Furthermore, some of the available projections were extended only up to 1975. In those cases, extrapolations using the component method of projections were made.

The population projections have been calculated on varying assumptions. A continuous decline in mortality has been assumed in almost every country at the rate observed as a general average in many areas in the 1950s. This corresponds to a gain of 2.5 years in expectation of life in every five-year period, wherever the expectation is less than 55 years; slightly accelerated gains from that level until the expectation approaches 65 years when slower gains were assumed, up to a limiting expectation of 73.9 years, beyond which the expectation of life is assumed to improve no further. For one country, India, the national projections (medium series) assumed a mortality decline somewhat more rapid than normal: a gain of 4.5, 4.1 and 3.8 years during the quinquennium 1961-65, 1966-71 and 1976-81 respectively.

For two countries (Federation of Malaya and Pakistan) the national projections assume mortality to remain constant at its level in recent years.

Fertility in terms of the birth-rate is assumed to start declining in the next few decades in about half of the countries of the region as follows: (a) a slight fertility decline of 2 per cent per quinquennium, starting 1970, in the Republic of Viet-Nam; (b) a moderate fertility decline of 5 per cent per quinquennium starting 1960, 1970 and 1975 for Ceylon, Republic of Korea, Laos and Philippines respectively;

1. United Nations, *The Population of South-East Asia (including Ceylon and China: Taiwan), 1950-1980*, 1958; *The Population of Asia and the Far East, 1950-1980*, 1959.
2. United Nations, *Provisional Report on World Population Prospects, as assessed in 1963*, 1964 (ST/SOA/SE/SER.R/7.).

TABLE A 1. Estimated population for the countries of the region, 1960-80 (in thousands)¹

Country	1960	1965	1970	1975	1980	Annual rate of increase (%)	
						1960-70	1970-80
Afghanistan	12 300	13 416	14 632	16 155	18 277	1.8	2.2
Burma	22 325	24 732	27 584	30 990	35 000	2.1	2.4
Cambodia	5 715	6 512	7 443	8 595	9 833	2.7	2.7
Ceylon	10 415	12 050	13 939	16 161	18 717	3.0	3.0
China, Republic of	10 612	12 249	14 060	15 728	17 421	2.8	2.8
India	432 719	486 985	550 506	620 300	685 900	2.4	2.2
Indonesia	92 871	109 189	125 855	144 552	168 050	3.1	2.9
Iran	20 762	23 261	26 310	29 830	33 736	2.3	2.5
Korea, Republic of	25 037	28 810	32 849	37 450	42 830	2.8	2.7
Laos	2 322	2 626	2 971	3 362	3 803	2.5	2.5
Malaysia and Singapore	9 775	11 417	13 321	15 616	18 308	3.1	3.2
Mongolia	937	1 075	1 250	1 450	1 675	2.9	3.0
Nepal	9 302	9 953	10 861	12 046	13 794	1.6	2.4
Pakistan	99 944	113 356	128 839	147 355	169 718	2.6	2.8
Philippines	27 425	32 357	38 504	46 194	56 093	3.4	3.8
Thailand	27 152	31 972	37 775	44 872	53 643	3.4	3.6
Viet-Nam, Republic of	14 000	15 600	17 700	20 500	23 400	2.4	2.8
TOTAL	823 613	935 560	1 064 399	1 211 156	1 370 198	2.6	2.57

1. For sources of the population projections used as basis for the estimates, see Appendix C, page 117.

(c) a moderate fertility decline of 5 per cent during the quinquennium 1971-76 and of 10 per cent during 1976-81 in Iran; (d) a regular fertility decline of 10 per cent per quinquennium starting 1960 and 1975 in the Republic of China and Cambodia respectively; (e) a rapid fertility decline for the whole period in Singapore, and in India, after 1961-66, a decline of 5, 10 and 20 per cent of previous values in each successive quinquennium respectively.

The projections for Burma, Indonesia, Federation of Malaya, Nepal, Pakistan and Thailand assume constant fertility until 1980.

National projections present data distributed by five-year groups of age. For the purposes of this study, estimates of the school-age population have been derived by applying Sprague multipliers¹ to the five-year groups in order to obtain smoothed single-year distribution for ages 6 to 21. Then data have been regrouped to correspond with the various levels of education: 6-12, 13-17 and 18-21 years for the first, second and third level of education respectively.

The projections of total population for each country in the region for quinquennial periods, 1960-80 are set forth in Table A 1. School-age population figures for 1960 and 1980 are presented in Table A 2.

The projections show that the total population of the region will increase from 824 million in 1960 to 1,370 million by 1980, which represents an increase of about 65 per cent over the twenty-year period 1960-80. In the decade 1970-80 the estimates imply a very slight reduction in the average rate of population growth as a whole from 2.60 to 2.57 per annum. This results mainly from the assumption of a falling trend in the birth-rate beginning during the 1960s or early 1970s.

Estimates of the school-age population and total population for the three groups are shown in Table A 3.

In analysing the trends it is necessary to keep in mind the deficiencies in the basic individual country data, the many combinations and

interplay of rates of national growth and declines in mortality and fertility in the countries composing the groups.

All countries in Group C had high fertility at the beginning of the projection period (1960-65), i.e., declining fertility has not yet affected the 6-12 age-group. The effect of a high birth-rate combined with a decreasing death-rate is reflected in an increasingly high proportion of children and youth in the population, i.e., the child and youth population is increasing more rapidly than the whole population. It is when the assumed declines in fertility take more appreciable effect as in Ceylon, the Republic of China and the Republic of Korea, which together contained 42 per cent of the population (around 1960), that the process of ageing starts; i.e., those in the youngest groups 0-4, 5-9, etc., whose numbers are directly affected by current fertility declines, do not increase as rapidly as before, and depending on the rate assumed in the decline in fertility, increase probably at a slower rate of growth than that of the total population. The older groups 13-17 and 18-21 in 1970-75 are not yet affected by a fertility decline that started the previous five years and ten years respectively and would possibly be still growing at a much faster rate than the total population. That is to say, there will still be more and more survivors to these older age-groups from birth cohorts that have themselves been hitherto increasing. The effects of declining fertility in the three countries are more vividly shown in the period 1975-80 when the rates of growth of the ages 6-12 and to a lesser extent of those in the older ages have very clearly slowed down and

1. Coefficients used for the derivation of numbers in single-year ages within a given five-year age group from numbers in this and certain adjacent five-year age groups. See: 'Future Population Projections of Single Year of Age—Interpolation Method', paper prepared by Unesco Regional Office, Bangkok, 3 September 1962.

TABLE A 2. Estimated school-age population in Asian countries, 1960 and 1980 (in thousands)

Country	Year	Total 6-21 years	6-12 years	13-17 years	18-21 years
Afghanistan	1960	4 429	2 330	1 311	788
	1980	6 915	3 418	2 050	1 447
Burma	1960	7 507	3 813	2 148	1 546
	1980	12 186	5 984	3 652	2 550
Cambodia	1960	2 059	1 082	582	395
	1980	3 825	1 913	1 126	786
Ceylon	1960	3 750	1 964	1 082	704
	1980	6 752	3 330	2 000	1 422
China, Republic of	1960	3 776	2 117	1 008	651
	1980	6 354	2 813	2 007	1 534
India	1960	151 836	75 142	44 912	31 782
	1980	255 929	122 010	78 038	55 881
Indonesia	1960	29 515	16 959	6 863	5 693
	1980	62 584	29 260	19 101	14 223
Iran	1960	7 468	3 931	2 209	1 328
	1980	12 721	6 295	3 806	2 620
Korea, Republic of	1960	8 723	4 404	2 523	1 796
	1980	15 754	7 436	4 670	3 648
Laos	1960	794	413	224	157
	1980	1 468	722	421	325
Malaysia and Singapore	1960	3 624	1 972	1 002	650
	1980	6 919	3 503	2 018	1 398
Mongolia	1960	280	156	70	54
	1980	490	273	121	96
Nepal	1960	3 344	1 689	980	675
	1980	4 917	2 500	1 400	1 017
Pakistan	1960	35 891	19 472	9 677	6 742
	1980	66 283	33 973	19 338	12 972
Philippines	1960	10 575	5 445	3 075	2 055
	1980	21 765	11 315	6 304	4 146
Thailand	1960	9 922	5 124	2 828	1 970
	1980	20 463	10 423	5 951	4 089
Viet-Nam, Republic of	1960	4 899	2 610	1 343	946
	1980	8 347	4 122	2 435	1 790
TOTAL	1960	288 393	148 622	81 837	57 932
	1980	513 672	249 290	154 438	109 944

Source. Data based on estimates of the population 6-21 years of age by single years, which have been derived by applying Sprague multipliers to the national data distributed by five-year groups of age.

these at levels below the growth rate of the whole population within the group for the same period.

According to the projections the population of Group C would increase at a slightly rising rate through the whole period. The declining in fertility assumed will apparently be offset by further reduction in the death-rates.

For Group B the same conclusions as stated above could probably be applied, with the difference that the reduction in fertility is more rapid in this group because it includes India which had, in 1960, 63 per cent of the group's population and for which a rapid fertility decline beginning 1966 has been assumed. A fairly more rapid ageing of the population would therefore result.

The estimates indicate that the population of Group B would continue to increase up to 1970, with a perceptible slow down

appearing in the latter part of the 1970s again mainly owing to the decline of fertility assumed for India.

The three countries in Group A were assumed to have constant fertility except Laos for which a fertility decline was assumed to start beginning 1970. These assumptions should be reflected in a population getting younger, i.e., increasing proportions of the population in the younger ages 6-12 and 13-17 and a correspondingly diminishing proportion in the older ages 18-21. For the same reason, there should be a faster increase in the population in the younger ages than the total population. But because of the shortcomings mentioned previously and the limitations of the available data the expected trends are not brought out clearly.

The estimates indicate for Group A that in the 1970s population growth will be even more rapid than in the preceding decades.

TABLE A 3. Estimated school-age population and total population, 1964 and 1980 (in thousands)

	1964	1980	Annual rate of increase 1964-80 (%)
Group A			
6-12	4 729	6 640	2.1
13-17	2 812	3 871	1.9
18-21	1 891	2 789	2.5
6-21	9 432	13 300	2.2
Total population	25 600	35 874	2.1
Group B			
6-12	141 869	203 830	2.3
13-17	78 900	127 617	3.0
18-21	52 816	90 918	3.4
6-21	273 585	422 365	2.8
Total population	762 500	1 127 312	2.5
Group C			
6-12	24 462	38 820	2.9
13-17	13 704	22 950	3.3
18-21	8 958	16 237	3.8
6-21	47 124	78 007	3.2
Total population	125 200	207 012	3.2
The region			
6-12	171 060	249 290	2.4
13-17	95 416	154 438	3.0
18-21	63 665	109 944	3.5
6-21	330 141	513 672	2.8
Total population	913 300	1 370 198	2.6

Source. Data based on estimates of the population 6-21 years of age by single years which have been derived by applying Sprague multipliers to the national data distributed by five-year groups of age.

The following sources of population projections were used as basis for the estimates of future population in the region for 1960-80:

- Afghanistan: Estimates prepared by Unesco Regional Advisory Team. Age composition based on the age distribution calculated for Iran.
- Burma: Burma Census Department, *Population Projections for Burma 1961-1975*, 29 July 1963.
- Cambodia: Estimates calculated by Unesco Regional Advisory Team by applying the component method.
- Ceylon: S. Selvaratnam, *Population Projections for Ceylon 1956-1981*, Colombo, National Planning Council, 1959. Medium estimates.
- China, Republic of: Manpower Development of Republic of China, *Population Forecast in Taiwan, Low Projections from 1962-1982*, Council for International Economic Co-operation and Development, 1964. Also 1965-80 projections prepared by Mr. Hsiao Chong-Siang, Council for International Co-operation, Taipei, Taiwan, 1964.
- India: Committee in Demography, Planning Commission, India, *Revised Population Projections 1961-1981*, 1964.
- Indonesia: *National Estimates for 1961-1981*, prepared by the National Institute of Economic Research, Faculty of Economics, University of Indonesia, 1964.

Iran: Mahmood Setaudeh Zand, *Population Growth in Iran. Revised Estimates 1961-1981*, Statistical Section, Planning and Projects Department, Plan Organization, October 1964. Medium projections.

Korea, Republic of: Republic of Korea, Bureau of Statistics, Economic Planning Board, *The New Projections for Korea, 1960-2000*. August 1964. New projections, Series III with inflated factor (medium mortality and medium fertility).

Laos: Estimates prepared by Unesco Regional Advisory Team by applying the component method.

Malaysia (Federation of Malaya): Federation of Malaya, Department of Statistics, *Paper A: Population*, Tables 1 (a) and 1 (b), 1962-82.

Singapore: Government of Singapore, 'Singapore: Country Statement', paper submitted at Asian Population Conference, New Delhi, December 1963. Rapid fertility decline estimates. Also United Nations estimates published in *The Population of South-East Asia (including Ceylon and China: Taiwan), 1950-1980*. 1958. Rapid fertility decline and immigration.

Sabah and Sarawak: United Nations estimates published in *The Population of South-East Asia (including Ceylon and China: Taiwan), 1950-1980*. 1958. Conservative projections.

Mongolia: Estimates prepared by Unesco Regional Advisory Team. Also estimates for total population presented in the United Nations *Provisional Report on World Population Prospects, as assessed in 1963* (ST/SAO/SER.R/7).

Nepal: Harsha Nath Takur, *Population Projections for Nepal, 1955-1975*. Ministry of Economics, Planning Central Bureau of Statistics, 1963. High mortality projection.

Pakistan: Pakistan Prospective Planning Section, *Population Projections for Pakistan 1961-1981*, November 1963.

Philippines: Philippines Inter-Agency Committee on Demography, *Projections of the Population of the Philippines by Age and Sex, according to Alternative Assumptions of Fertility and Mortality, 1960-1980*, 1964. Medium series.

Thailand: Halvor Gills and Thip Chatsthor, *The Demographic Outlook of Thailand and Some Implications*, revised, November 1963. Series I, constant fertility, moderate mortality decline.

Viet-Nam, Republic of: Estimates prepared by Unesco Regional Advisory Team by applying the component method.

Appendix B

Assumptions concerning the number of teachers and supervisors required

Estimates of the number of teachers and supervisors required depend—given the enrolment increase—on two main assumptions: pupil-teacher ratio and annual replacement rate. Level of qualification required from new teachers for the first level is given in Table 34, page 91. At the second level, it is assumed that all teachers are higher-education graduates. Pupil-teacher ratios are shown in Appendix D.

TABLE B 1. Annual replacement rate of teachers (percentage)

	Group A		Group B		Group C	
	1964	1980	1964	1980	1964	1980
First level	7	6	6	4	5	4
Second level	6	5	5.5	4	4.5	3.5
Third level	5	4	4.0	3.5	4.0	3.5

A decreasing replacement rate has been foreseen as a consequence of the improvement in teachers' status and also on the assumption that transfers of teachers from the first to the second level would be exceptional.

TABLE B 2. Number of supervisors required as a proportion of the number of teachers

		1964	1970	1975	1980
First level	1 for	145	130	120	110
Second level	1 for	340	300	280	250

Appendix C

Selected educational, demographic, economic and cultural indicators for countries by group¹

Country	(a) Public expenditure on education (% of national income) 1962	(b) Adult illiterates (% of population 15 +) 1961	(c) Expectation of life at birth for males (years) 1959-60	(d) Economically active population in agriculture (%) 1962	(e) GNP, per capita (U.S.\$) 1963	(f) Energy consumption per capita (coal equivalent in kilograms) 1963	(g) Newsprint consumption per capita (kilograms) 1963
<i>Group A</i>							
Afghanistan	...	94	...	90	61	20	...
Laos	...	72	...	86	68	38	0.01
Nepal	...	91	...	94	...	5	...
<i>Group B</i>							
Burma	2.5	40	40.8	63	76	55	0.6
Cambodia	1.9	...	44.2	82	68	48	0.2
India	2.6	73	45.2	74	73	170	0.3
Indonesia	1.2	...	...	72	73	111	0.2
Iran	3.1	84	...	56	153	...	0.4
Mongolia	...	...	...	...	...	...	...
Pakistan	1.8	81	...	75	74	83	0.2
Viet-Nam, Republic of	1.8	84	...	88	78	62	0.5
<i>Group C</i>							
Ceylon	5.9	27	60.3	53	146	114	1.1
China, Republic of	4.1	41	61.3	56	139	573	1.0
Korea, Republic of	6.8	30	51.2	80	130	391	1.7
Malaysia	...	47	55.8	59	235	285	1.5
Philippines	3.6	28	48.8	61	135	191	1.3
Singapore	...	...	...	9	336	821	...
Thailand	2.9	33	48.7	82	116	84	0.6

1. Afghanistan: column (b), 1965; (d), 1961, includes nomads; (e), 1961. Laos: (b), 1962; (d), 1960. Nepal: (d), 1952-54. Burma: (b), 1962; (c), 1954; (d), 1953-54. Cambodia: (a), 1954; (b), 1963; (c), 1958-59; (e), 1961; (f), 1962. India: (a), 1961; (c), 1957-58; (f), 1962. Indonesia: (a), 1952; (e), 1961; (f), 1961. Iran: (a), 1961; (c), 1957-58; (f), 1962. Pakistan: (d), 1961; (e), 1961. Viet-Nam: (b), 1962; (d), 1960; (f), 1961. Ceylon: (a), 1961; (b), 1963; (c), 1954; (d), 1963. China: (d), 1956. Korea: (b), 1960; (c), 1955-60; (d), 1960; (f), 1962. Singapore: (d), 1957; Philippines: (b), 1960; (c), 1946-49; (d), 1960; (f), 1962. Thailand: (a), 1963; (b), 1960; (c), 1947-48; (d), 1960.

Sources. (a) *Unesco statistical yearbook 1964*, Paris, Unesco, 1966. (b) *Statistics of illiteracy*, World Congress of Ministers of Education on Eradication of Illiteracy, Teheran, 8-19 September 1964, Paris, Unesco, 1965. (c) *Demographic yearbook 1963*, New York, United Nations, 1964. (d) *Economic survey of Asia and the Far East 1964*, United Nations, 1965. Afghanistan, Laos, Cambodia and Viet-Nam from: *Reports of the Unesco regional advisory teams for educational planning in Asia*, Bangkok, Unesco Regional Office for Education in Asia, 1965. Burma and Indonesia from: *Unesco Regional Office for Education in Asia, 1965*. Guy Hunter, *High-level manpower for development*, Unesco-IAU Research Programme in Higher Education, May 1964, manuscript. (e) *Educational situation in Asia—past trends and present status*, Tokyo, Unesco and the Ministry of Education, Japan, 1965. Conference of Ministers of Education and Ministers Responsible for Unesco. Edecas/7. Writing paper. (f) *Statistical yearbook 1964*, New York, United Nations, 1965. (g) *Unesco statistical yearbook 1964*, Paris, Unesco, 1966.

Appendix D

Determining educational assumptions used in the Asian Model

	Group A				Group B				Group C			
	1964	1970	1975	1980	1964	1970	1975	1980	1964	1970	1975	1980
Transition rates:												
Grade VII	0.88	0.90	0.86	0.83	0.86	0.85	0.82	0.81	0.85	0.83	0.76	0.74
General (X)	0.59	0.68	0.74	0.80	0.70	0.70	0.70	0.70	0.80	0.74	0.69	0.65
Vocational (X)	0.46	0.28	0.10	0.10	0.60	0.42	0.27	0.10	0.58	0.44	0.19	0.10
General (XII)	0.73	0.70	0.70	0.70	0.72	0.65	0.60	0.55	0.63	0.60	0.55	0.50
Technical (XII)	0.46	0.34	0.24	0.20	0.45	0.39	0.31	0.25	0.46	0.34	0.30	0.30
Enrolment in type as proportion of enrolment in grade:												
General (VIII)	0.79	0.80	0.80	0.80	0.80	0.74	0.70	0.70	0.90	0.80	0.70	0.75
General (XI) ¹	0.87	0.76	0.66	0.61	0.70	0.64	0.60	0.60	0.57	0.60	0.60	0.60
Science, science-based, technological and technical (XIII) ²	0.30	0.48	0.61	0.61	0.43	0.50	0.55	0.61	0.39	0.53	0.64	0.65
Pupil-teacher ratios:												
First level (I-VII)	36.0	36.0	40.0	45.0	38.0	38.0	40.0	45.0	38.0	38.0	40.0	45.0
General (VIII-X)	19.0	19.0	20.0	25.0	25.0	25.0	25.0	30.0	30.0	30.0	30.0	30.0
Vocational (VIII-X)	10.0	15.0	20.0	20.0	18.0	23.0	25.0	25.0	21.0	24.0	25.0	25.0
General (XI-XII)	15.0	18.0	20.0	20.0	20.0	23.0	25.0	25.0	25.0	25.0	25.0	25.0
Technical (XI-XII)	10.0	15.0	20.0	20.0	15.0	19.0	20.0	20.0	20.0	20.0	20.0	20.0
Teacher training (XI-XIII)	14.0	19.0	24.0	25.0	18.0	22.0	25.0	25.0	17.0	22.0	25.0	25.0
Science, science-based, technological and technical (XIII +)	11.0	12.0	12.0	12.0	11.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Arts, education and other (XIII +)	23.0	22.0	22.0	22.0	23.0	22.0	22.0	22.0	23.0	22.0	22.0	22.0

1. The proportion in General (XI) is applied to Grade XI enrolment less Teacher training (XI) enrolment which is determined separately on the basis of the number of additional teachers required from this type of teacher-training institution.

2. The proportion in Science and technological and technical (XIII) is applied to Grade XIII enrolment less Teacher training (XIII) and Education course (XIII) enrolment which are determined separately on the basis of the number of additional teachers required from these types of teacher-training institutions.

Appendix E

Educational output and manpower supply: survival

For the 1964 stock as well as the additional output, use has been made of the life tables prepared by the United Nations¹ on the assumption of a higher life expectancy (50 years) for both males and females. A further assumption made, for purposes of calculating the survival rates for males and females combined, was that the 1964 manpower stock who completed Grades XII + was composed of males to females in the ratio of 5:1 whereas the 1964-70 output would reflect a sex ratio of 4:1, the 1971-75 output a sex ratio of 3:1 and the 1976-80 output a sex ratio of 2:1. From analysis of what data were available on the 1964 age distribution of the population who completed Grade XII and above it was assumed that the average age, in 1964, was 35 years. The average age for output, at leaving school, was assumed to be 19 years for those completing Grades XII-XV and 23 years for those completing Grade XVI and above. For the cumulative output 1964-70 the average time interval was taken at three years until 1970, eight years until 1975 and thirteen years until 1980. For the 1971-75 output the average time interval between output and 1975 was assumed at two years, and between output and 1980 at seven years. Similarly, the average time between output and 1980 was taken at two years for the cumulative output 1976-80.

Thus, the average age of the stock and output in 1970, 1975 and 1980 was assumed to be:

	Average age (in years) of those completing Grade XII + in:		
	1970	1975	1980
1964 stock (XII +)	41	46	51
1964-70 output			
Grades XII-XV	22	27	32
Grades XVI +	26	31	36
1971-75 output			
Grades XII-XV		21	26
Grades XVI +		25	30
1976-80 output			
Grades XII-XV			21
Grades XVI +			25

1. United Nations, *Methods for Population Projections by Sex and Age*. New York, 1956 (Population Studies, No. 25), see Table III, pp. 76-7.

Under these assumptions the survival rates used to obtain stock and output surviving until 1970, 1975 and 1980 were:

	Survival ratios of those completing Grade XII + to:		
	1970	1975	1980
1964 stock (XII +)	0.9539	0.9084	0.8515
1964-70 output			
Grades XII-XV	0.9836	0.9531	0.9222
Grades XVI +	0.9813	0.9499	0.9173
1971-75 output			
Grades XII-XV		0.9896	0.9594
Grades XVI +		0.9876	0.9563
1976-80 output			
Grades XII-XV			0.9896
Grades XVI +			0.9877

Appendix F

Assumptions used for estimating public expenditures on school education and public revenues

	1964	1970	1975	1980
Group A				
Estimated public expenditures on school education as percentage of total costs of education	80	81	82	83
Estimated public revenues as percentage of GNP:				
Hypothesis I (low)	7	10	12.5	15
Hypothesis II (high)	7	12	16	20
Group B				
Estimated public expenditures on school education as percentage of total costs of education	72	74	76	78
Estimated public revenues as percentage of GNP:				
Hypothesis I (low)	17	19	21	24
Hypothesis II (high)	17	21	24	28
Group C				
Estimated public expenditures on school education as percentage of total of education	75	77	79	80
Estimated public revenues as percentage of GNP:				
Hypothesis I (low)	20	22	23.5	25
Hypothesis II (high)	20	24	27	30

Appendix G

Glossary of symbols used in the concepts for an educational Model

\widehat{ADT}	= a particular type of adult education
B	= population not previously enrolled
D	= number of pupil-places to be completed for the following year
\dot{D}	= number of resident-places for students to be completed for the following year
\bar{D}	= number of resident-places for teachers to be completed for the following year

\dot{D}	= number of pupil-places to be completed for the following year adjusted by the utilization factor
E	= enrolment, full-time
\dot{E}	= enrolment, if it differs from full-time
F	= average teacher salary
I	= net immigrants into the school system
INS	= a specific type of in-service training course for teachers
J	= net illiterate immigrants into the population
LIT	= literacy courses
M	= number of literates
N	= newcomers who have previously been in the school system but have not been a part of it for one or more years
P	= population
Q	= number of pupil-places to be built
\dot{Q}	= number of resident-places to be built for students
\bar{Q}	= number of resident-places to be built for teachers
R	= number of additional teachers needed for teaching, full-time
T	= number of teachers needed for teaching, full-time
\dot{T}	= number of teachers needed for teaching if it differs from full-time
TTR	= a specific type of teacher-training course
U	= total capital costs
V	= total recurring costs
W	= total costs
Z	= number of illiterates
\dot{Z}	= illiterate population not previously enrolled in literacy courses
a	= age
\dot{a}	= beginning age of adulthood
b	= retirement rate of teachers
\widehat{ca}	= cost of site per unit area for schools
\widehat{cb}	= cost per unit area for building teaching and common facilities
\widehat{cc}	= cost per unit area for building laboratories
\widehat{cd}	= cost per unit area for building auditoria and gymnasias
\widehat{ce}	= cost per unit area for building workshops and other special school facilities
\widehat{cf}	= cost of site per unit area for student residences
\widehat{cg}	= cost per unit area for building student-residence bedrooms and dormitories
\widehat{ch}	= cost per unit area for building student-residence common facilities
\widehat{ci}	= cost of site per unit area for teacher residences
\widehat{cj}	= cost per unit area for building teacher residences
d	= distribution proportion of enrolment
\hat{d}	= distribution proportion of teachers by qualification
e	= rate of first-time enrolment
f	= pupil-teacher ratio
\hat{f}	= adjusted pupil-teacher ratio
g	= grade
\dot{g}	= terminal grade
h	= transfer rate within the teaching profession
k	= any number, independent of n
\dot{k}	= grade at which literacy is achieved
l	= proportion leaving the system with successful completion of the grade
m	= school-entering age
n	= any number
p	= promotion rate

qa	= per-pupil-place area requirements for site for schools
qb	= per-pupil-place area requirements for teaching and common facilities
qc	= per-pupil-place area requirements for laboratories
qd	= per-pupil-place area requirements for auditoria and gymnasia
qe	= per-pupil-place area requirements for workshops and other special school facilities
qf	= per-resident-place area requirements for site for student residences
qg	= per-resident-place area requirements for student-residence bedrooms and dormitories
qh	= per-resident-place area requirements for student-residence common facilities
qi	= per-resident-place area requirements for site for teacher residences
qj	= per-resident-place area requirements for teacher-residence buildings
r	= repetition rate
s	= survival rate, demographic
t	= any type of education or course
\hat{t}	= type and level of education or course completed by teachers
u	= per-pupil-place capital cost for schools
\hat{u}	= per-resident-place capital cost for student residences
\bar{u}	= per-resident-place capital cost for teacher residences
ub	= cost per pupil-place for furniture and equipment, etc., for teaching and common facilities
uc	= cost per pupil-place for furniture and equipment, etc., for laboratories
ud	= cost per pupil-place for furniture and equipment, etc., for auditoria and gymnasia
ue	= cost per pupil-place for furniture and equipment, etc., for workshops and other school facilities
ug	= cost per resident-place for furniture and equipment, etc., for student-residence bedrooms and dormitories
uh	= cost per resident-place for furniture and equipment, etc., for student-residence common facilities
uj	= cost per resident-place for furniture and equipment, etc., for teacher residences
v	= per-pupil recurring costs
va	= per-pupil teacher-salary cost
vb	= per-pupil personnel cost, other than teacher-salary cost
vc	= per-pupil cost of general administration
vd	= per-pupil cost of maintenance and operation of educational establishments
ve	= per-pupil cost of books
\dot{ve}	= per-pupil cost of books for pupils receiving books
vf	= per-pupil welfare cost
\dot{vf}	= per-pupil welfare cost for pupils receiving welfare
vg	= per-pupil auxiliary cost
\dot{vg}	= per-pupil auxiliary cost for pupils receiving auxiliary services
vh	= per-pupil scholarship and stipend cost
\dot{vh}	= per-pupil scholarship and stipend cost for pupils receiving scholarships and stipends
vi	= per-pupil cost of instructional materials, other than books

w	= proportion leaving the system without successful completion of the grade
x	= proportion of existing pupil-places to be replaced for the following year
\dot{x}	= proportion of existing resident-places for students to be replaced for the following year
\bar{x}	= proportion of existing resident-places for teachers to be replaced for the following year
y	= year
α	= adjustment factor in relation to full-time enrolment
β	= proportion of pupil-places requiring one year to complete
$\hat{\beta}$	= proportion of pupil-places requiring two years to complete
$\bar{\beta}$	= proportion of pupil-places requiring three years to complete
γ	= adjustment factor in relation to full-time teachers
δ	= proportion of first-year building of pupil-places requiring three years to complete
$\dot{\delta}$	= proportion of second-year building of pupil-places requiring three years to complete
$\bar{\delta}$	= proportion of third-year building of pupil-places requiring three years to complete
ϵ	= proportion of literates becoming illiterate
ζ	= school system leaving rate, other than retirement
η	= proportion of teachers to receive a specific type of in-service training course
$\dot{\eta}$	= proportion of additional teachers to receive a specific type of in-service training course
θ	= proportion of first-year building of pupil-places requiring two years to complete
$\dot{\theta}$	= proportion of second-year building of pupil-places requiring two years to complete
λ	= utilization factor in relation to full one-shift utilization of pupil-places
μ	= proportion of pupils receiving books
$\dot{\mu}$	= proportion of pupils receiving welfare
ξ	= average time units of teaching received per full-time pupil
π	= proportion of students in student residences
$\hat{\pi}$	= proportion of teachers in teacher residences
ρ	= proportion of additional teachers not coming directly from teacher-training institutions
σ	= proportion of graduates not entering the profession
τ	= proportion of illiterates becoming literate
v	= proportion of pupils receiving auxiliary services
\dot{v}	= proportion of pupils receiving scholarships and stipends
φ	= average time units of teaching given per full-time teacher
ψ	= criteria defining the population relevant for adult education
ω	= the length of time between cycles of in-service training
\rightarrow	= going to
Σ	= sum of

The following symbols, extra to the above list, are used for the methodology in the Asian Model:

K	= proportion of average teacher salary to all recurring costs excluding books, welfare, auxiliary, stipend and central administration
L	= percentage of central administration costs to all other recurring costs excluding welfare, auxiliary and stipend costs
O	= number of students leaving the system (output)
c	= cost per unit area (square metres) for building schools
\hat{c}	= cost per unit area (square metres) for building student residences

- o = proportion of enrolment leaving the school system
 q = per-pupil-place area requirements (square metres) for building schools
 \dot{q} = per-resident-place area requirements (square metres) for building student residences
 $\dot{u}a$ = cost per pupil-place for site for schools
 ua = cost per resident-place for site for student residences

- $\dot{u}k$ = cost per pupil-place for furniture and equipment, etc., for schools
 uk = cost per resident-place for furniture and equipment, etc., for student residences
 \bar{z} = proportion of teachers leaving the school system for all reasons

Appendix H

Recommendations of the Conference of Ministers of Education and Ministers responsible for Economic Planning of Member States in Asia

Convened by Unesco with the co-operation of ECAFE, Bangkok, 22-29 November 1965

The Conference

A

1. *Having reviewed* the progress made since the Tokyo Meeting of Ministers of Education on the preparation of long-term educational plans and objectives and the implementation of the Karachi Plan;
2. *Notes with satisfaction* that there is evidence of impressive progress in many directions towards a better achievement of objectives and a more precise identification of the principal problems in the field of education;
3. *Observes* that, in some cases with the assistance of Unesco and other international agencies, institutional arrangements have been established for better assessment of the over-all situations and for more systematic planning of education as an integral part of general economic and social planning;
4. *Welcomes* the greater awareness of Asian countries of such major tasks as increasing the enrolment in rural areas and among girls, reducing illiteracy, improving the quality of education and adapting it to present needs, revising the curricula and raising teachers' qualifications, expanding scientific and technical education, as well as diversifying secondary education and modernizing the administration;
5. *Considers* that the sense of determination of member governments and the readiness of their people to co-operate have been largely responsible for the progress recorded in this vital sphere of national life;
6. *Believes* that a significant contribution to these results has also been made notably through Unesco, by the sense of shared purpose and the widening of mental horizons and the revitalizing of the apparatus of education resulting from the Karachi and Tokyo conferences, as well as subsequent meetings;
7. *Recognizes* the impulsion of the logical processes which have led Member States to take an integrated view of education, not in isolation, but as an essential and all-pervading element of all economic and social progress and which has inspired the setting of objectives for their present conference, and the preparation of long-term plans of education for each Member State;
8. *Expresses* its deep appreciation for the assistance furnished by Unesco, in co-operation with ECAFE, in thus preparing well the ground for the deliberations of this conference, as well as for its

work in assisting Member States in their efforts to attain the objectives defined at previous meetings of ministers of the region.

B

I. CONCERNING THE ASIAN MODEL (PERSPECTIVES OF EDUCATIONAL DEVELOPMENT IN ASIA) AS A CONCEPTUAL FRAMEWORK AND GUIDELINE

1. *Considering* that the draft Asian Model may contribute to an **essential** improvement of planning methods and the determination of educational targets;
2. *Noting* the methodology and criteria used in the establishment of the projections for the Asian region;
3. *Noting* that the Model is designed as a tool for identifying some of the main problems, quantitative and qualitative, involved in extending the Karachi Plan to cover all levels and forms of education;
4. *Recognizing* and appreciating the value of the contribution it makes to the techniques of educational planning;
5. *Emphasizing* that it is intended as a broad framework within which each country will identify its needs, formulate its objectives, determine its priorities and evolve a strategy of educational development most appropriate to its particular conditions;
6. *Endorses* the general approach of the Model;
7. *Invites* all Member States in the region:
 - (a) to identify their educational needs and study the alternative ways of meeting them;
 - (b) to keep under review continuously the national targets for all types, sectors and levels of education;
 - (c) to develop, in particular, the technique of assessing manpower requirements; and to create or strengthen national machinery for assessing human resources;
 - (d) to improve the collection and compilation of the statistical data needed for successful educational planning; and
 - (e) to train a larger number of national experts in the use of modern techniques and methods of educational planning, particularly the use of computer techniques;
8. *Recommends* that Member States in the region make full use of the draft Asian Model, adapted as necessary to national conditions and objectives, within the framework of a clearly defined educational policy;

9. *Recommends* that it be published by Unesco and distributed to Member States for consideration and periodic review and revision after incorporation of the revisions, amendments and alterations suggested by the Commissions and the statistical corrections made by the Member States.

II. CONCERNING THE METHODOLOGY AND CONCEPTS USED IN THE ASIAN MODEL

1. *Endorsing* the concepts used in the methodology for quantification of educational hypotheses presented in the draft Asian Model;
2. *Welcoming* the flexibility of this instrument, which makes it suitable for national policy-makers;
3. *Noting* the advantages, for international comparability, of the wide use of a standard method flexible enough to be adapted to the varying conditions and objectives of different countries and regions;
4. *Invites* the appropriate scientific institutions and research workers to study further the proposed methodology and to evaluate the results obtained with it in various countries;
5. *Invites* Unesco to help Member States, on request, in initiating studies and adapting the Asian Model for the elaboration of their long-term national plans of education;
6. *Invites* Member States in the region to exchange experiences in the implementation of the new techniques and methodologies used in defining targets;
7. *Recommends* that steps be taken, with the co-operation and assistance of Unesco, to improve and develop the methodology through pilot projects, expert meetings, workshops and aid to Member States;
8. *Recommends* that a scientific methodology for projecting educational needs be used also for planning adult literacy projects and actions; and that relevant statistical and other data be collected and the necessary research organized to evaluate costs and returns with a view to preparing possible projections in this field according to national conditions, needs and objectives;
9. *Draws attention* to the advisability of putting at the disposal of the countries in the region necessary services and equipment including computer services to cater for their needs in connexion with the application of the Model.

III. CONCERNING THE REVISION OF THE ASIAN MODEL

1. *Recognizing* the advisability of revising the document on perspectives of educational development in Asia, and in particular the quantitative projections, in the light of the discussions and of the possible revision of the regional policy targets existing at the time the document was prepared;
2. *Noting* the general feeling that some of the objectives for Group A countries, although below those established for the entire region in the Karachi Plan and the Tokyo conference, were too high;
3. *Recommends* accordingly that the draft Asian Model be revised from time to time to take account of changing conditions;
4. *Requests* that the chapter on adult literacy in the draft Asian Model be suitably revised to take into account the recommendations of the Teheran Congress of Ministers of Education;
5. *Recognizing* that the average rates of economic growth of the countries of the region are not always sufficient when compared with those of developed countries;
6. *Considering* that, to further economic development in the future, the qualitative improvement of the labour force of the nations of the region is especially important;

7. *Noting* that when the demographic, economic and educational situations of the countries of the region, at periods when various economic indices of Japan and the region are similar, are compared with the past development stages of Japan, the expansion rate of the population of the region is found to be higher whereas the enrolment rate of primary-school children is much lower than that of Japan;

8. *Requests* the Asian countries and Unesco to undertake, if the need is felt and with the help of ECAFE, investigations and studies of economic and social factors which keep down the enrolment rate in primary schools.

IV. CONCERNING THE RELATIONSHIP OF EDUCATIONAL OUTPUT AND MANPOWER NEEDS

1. *Considering* that when educational development plans are consolidated in national social and economic development programmes, not only must the financial needs of the educational development be included in the economic programme, but also the manpower needs for economic development and the manpower supply from the development plan of education must be systematically co-ordinated;
2. *Recognizing* that the method of estimating the social needs of new graduates from schools developed by the Japanese Government may be one of the appropriate means of obtaining basic materials necessary for such systematic co-ordination;
3. *Recommends* that the countries of the region undertake research, in co-operation with each other and with the assistance of Unesco, ILO and other agencies, into techniques for taking censuses and estimating manpower needs for economic development.

V. CONCERNING EDUCATIONAL ADMINISTRATION AND PLANNING

1. *Recommends* that Member States
 - (i) make a careful survey of the administrative structure of education in the context of the magnitude of the tasks that lie ahead in educational reorganization and development;
 - (ii) establish adequate training facilities for educational administrators;
 - (iii) give high priority to developing a bureau for educational planning and statistical services;
2. *Invites* Unesco
 - (i) to increase the facilities for the training of personnel for educational administration and planning at the regional and international institutes, as well as the number of fellowships for advanced training in the region;
 - (ii) to assist Member States with equipment and fellowships in organizing and conducting national training courses;
 - (iii) to develop further clearing-house activities for the dissemination of information relating to educational planning and administration at the regional office at Bangkok;
 - (iv) to organize facilities for the training of statistical personnel.

VI. CONCERNING PRIORITIES, CRITERIA AND QUALITY OF EDUCATION

1. *Convinced* that quality of education must be accorded the highest priority in national plans of educational development;
2. *Concerned* at the risk to educational standards when numerical increase is allowed to take place without adequate facilities and preparation;

3. *Recommends* that educational development should be so regulated that expansion and quality improvement move together and a proper balance is maintained, at least at the secondary and higher levels.

VII. CONCERNING THE PROBLEM OF WASTAGE

1. *Deeply concerned* at the high incidence of drop-outs and repetition which characterizes the educational system in many countries of the region;
2. *Recommends* to Member States
 - (i) that systematic studies and research be undertaken into the causes of drop-outs and the social and other factors involved, and the effectiveness of different methods in improving the situation;
 - (ii) that comprehensive and integrated programmes comprising curriculum reconstruction, improvement of textbooks and instructional materials, use of new techniques of teaching and learning, training of teachers and supervisory staff, and school-community relationship be elaborated and started, in the first instance, as experimental projects in carefully selected areas in each country so that the experience thus acquired may be expanded more effectively;
 - (iii) that higher priority be accorded in national educational plans to schemes of school lunches and supply of free textbooks to children in the primary schools;
 - (iv) that studies be made with a view to evolving scientific testing and evaluation procedures for assessing the students' performance and potential;
3. *Invites* Unesco
 - (i) to assist Member States in undertaking the studies and research recommended above and to disseminate their findings;
 - (ii) to assist in the development and implementation of experimental projects for the eradication of educational wastage;
 - (iii) to enlist the co-operation and assistance of Unicef, of other international organizations and of Member States in support of school lunch schemes and the supply of printing machinery and paper for free textbooks.

VIII. CONCERNING THE TRAINING OF TEACHERS AND SUPERVISORS

1. *Believing* that the training of teachers has the highest priority in any programme of qualitative improvement and quantitative expansion of education;
2. *Recognizing* that the supply, qualification and training of teachers for different levels and types of education are crucial factors in achieving the targets envisaged in the Model;
3. *Accepting* the broad targets suggested in the revised Asian Model for raising the basic qualification requirements for teachers;
4. *Recommends* that Member States
 - (i) take steps to improve the conditions of service, emoluments and status of teachers;
 - (ii) prepare long-term comprehensive and suitably phased programmes for the supply and training of teachers, the reorganization of teacher training and the progressive raising of the level of teacher qualifications;
 - (iii) organize in-service training of teachers in order to keep the teacher abreast with modern advances in educational theory and practice and in his own subject field, and to enable those who do not possess adequate qualifications or are untrained, to acquire needed qualifications;

- (iv) evolve procedures for the selection of suitable candidates for the teaching profession and provide incentives through scholarships to attract talented candidates;
- (v) provide residential teacher-training institutions with teachers under training and members of the staff living on the campus;
- (vi) organize the training of teachers in close association with universities and institutions with degree-conferring status;
- (vii) consider the advisability and feasibility of adopting for the training of second-level teachers a pattern in which professional training and general education are given concurrently over a period of three or four years, so that the academic education of prospective teachers can be related more closely to their professional education and future work and a longer period be given to them for professional orientation;
- (viii) recruit as supervisory personnel highly qualified persons whose competencies are utilized to up-grade the level of the teaching staff and the school programme;
- (ix) include in the professional teacher-training courses training for the teaching of adults;
- (x) enlist the active participation of universities in organizing and conducting in-service education of teachers through evening classes, and expanding facilities for specialized studies in education;
- (xi) make adequate provision for the training of teacher educators;
- (xii) enlist the support of teachers' organizations in programmes of in-service education.

IX. CONCERNING EDUCATIONAL RESEARCH

1. *Considering* the vital importance of educational research for the qualitative improvement of education,
2. *Recommends* to Member States
 - (i) that national agencies be established for educational research;
 - (ii) that special attention be given to the proper selection and training of research workers and that the interdisciplinary nature of educational research be emphasized;
3. *Invites* Unesco
 - (i) to assist the development of strong national and regional programmes of clearing-house activities on educational research in Asia;
 - (ii) to assist Member States by developing co-operative programmes of educational research and to enable educational experts within the country and in the region to make joint studies in such areas as curriculum construction, teaching methods and audio-visual aids;
 - (iii) to assist Member States by providing equipment and fellowships for the training of research personnel;
 - (iv) to enlist the assistance of the Special Fund and other appropriate organizations for establishing, at the national and regional levels, institutes for studies and experiments in new teaching techniques and audio-visual materials and their adaptation to suit the needs of Asian countries.

X. CONCERNING ADULT, YOUTH AND FAMILY EDUCATION AND LITERACY

1. *Considering* the need for harmonized educational systems embracing all types and levels of education, considering further the disproportion between scarce resources and educational demands;

2. *Considering* the recommendations adopted by the International Conference on Public Education and the Teheran World Congress on the Eradication of Illiteracy, and the resolution of the Second Committee of the United Nations General Assembly;
3. *Deeply concerned* at the high numbers of illiterates among adults in the Asian region and the fact that a large number of young people will still not have access to formal education for some years to come, or will have left school without sufficient training;
4. *Convinced* that the fight against illiteracy needs simultaneous action for extending general primary education and for the progressive eradication of adult illiteracy, and that educational plans should make provision for both as integral parts of national education;
5. *Recommends*
 - (i) that the instruction given to illiterates include useful knowledge to enable them to contribute toward higher productivity in agriculture, industry, and handicrafts and to their active and fruitful participation in community life;
 - (ii) that efficient programmes be developed for the production and dissemination of suitable reading materials and that library services be urgently established to enable new literates to use their newly acquired knowledge;
 - (iii) that various non-governmental organizations, and workers' women's, youth and religious associations, take a greater part in these activities;
 - (iv) that universities and institutions of higher learning be called upon to assist in different ways in promoting programmes of adult literacy and continuing education, preferably by the establishment of special departments of adult education;
 - (v) that research institutes undertake more studies into the interdisciplinary as well as the educational and methodological aspects of adult education and literacy programmes;
6. *Invites* Unesco, in view of the vast number of illiterates in the region
 - (i) to extend its activities of encouragement and assistance to national literacy programmes;
 - (ii) to assist Member States in drawing up plans and carrying out functional literacy projects;
 - (iii) to undertake experimental literacy projects in Asia with the assistance of the Special Fund and other appropriate international and regional institutions;
 - (iv) to promote co-operation and co-ordination between international assistance, regional programmes like the Unesco Regional Reading Materials Centre and the Colombo Plan and bilateral aid programmes;
7. *Calls* upon Member States
 - (a) to include in their educational plans provisions for larger adult literacy and continuing education programmes, particularly with a view to training the manpower needed for the achievement of priority economic goals;
 - (b) to include functional literacy programmes in priority schemes of economic and social development, both existing and future;
 - (c) to investigate the possibility of obtaining additional resources for functional literacy programmes by drawing upon the funds available to different ministries, by establishing literacy trust funds to which governmental and non-governmental institutions could contribute, and by using legislative means to encourage public and private enterprises to participate in such programmes;

8. *Calls* upon Member States
 - (i) to promote actively adult literacy within the framework of national plans, priorities and development targets;
 - (ii) to formulate and declare a national policy under which the activities of different ministries and governmental and non-governmental agencies would be directed and co-ordinated;
 - (iii) to make use of existing educational facilities, institutions, teachers and students, as well as to promote new facilities, specific institutions, and new cadres of educational staff for adult literacy;
 - (iv) to constitute national literacy and adult education boards and provide adequate administrative machinery within the ministries of education to co-ordinate the efforts of other departments and voluntary organizations;
 - (v) to use more fully existing regional institutes for the training of high-level personnel and as supporting services to national literacy programmes.

XI. CONCERNING THE EDUCATION OF GIRLS AND WOMEN

1. *Noting* the wide disparities between the educational opportunities for boys and girls which still exist in many countries of the region;
2. *Considering* that the one factor that will above all determine the success of the expansion programmes and equalization of educational opportunities is the speed and effectiveness with which enrolment of girls at all levels of education is increased;
3. *Observing* that the causes of the slow progress of education for girls and women in Asia are both social and economic;
4. *Endorses* the suggestions contained in Section 3.2 of the draft Asian Model and, in particular;
5. *Invites* Member States
 - (i) to provide special incentives and facilities for increasing enrolments of girls at all levels;
 - (ii) to give high priority to building up an adequate supply of women teachers by establishing educational training institutions and providing incentives for women to enter the teaching profession;
 - (iii) to set up a suitable advisory body composed of important voluntary organizations to advise them from time to time on the steps to be taken for expanding the education of girls and women;
 - (iv) to mobilize voluntary organizations, parent-teacher associations and educational institutions in a sustained campaign for educating public opinion in this regard;
6. *Invites* Unesco to give assistance to voluntary women's organizations in order to support national promotional activities for the improvement of girls' and women's education.

XII. CONCERNING GENERAL, VOCATIONAL AND TECHNICAL EDUCATION (INCLUDING AGRICULTURAL EDUCATION)

1. *Considering* the close links between general education and vocational education;
2. *Mindful* of the scale on which skilled personnel would be required for the developing economies of the countries;
3. *Recognizing* the urgent need to increase agricultural productivity as an essential pre-condition for all-round economic development;
4. *Recommends* to Member States
 - (i) that general education and vocational education be conceived as aspects of the same educative process;
 - (ii) that the curriculum of the elementary school be so designed that, while it provides a sound general education, it also

incorporates the elements of work experience in a form appropriate to the stage of development of the pupils and linked to the needs of the local communities and, at the upper grades of the primary school, to opportunities for pre-vocational experiences;

- (iii) that, at the lower stage of the second level, to the extent that the financial means of the States permit, a practical work programme centred around farming operations or workshop practices be made an essential part of the general education of all pupils, it being understood that such practical work should not be confused with vocational training proper;
- (iv) that studies be carried out to assess in detail the requirements for different occupations in order to ensure that output from vocational institutions is sufficient to meet the needs of the economy;

5. *Invites* Unesco and other interested international organizations

- (i) to give high priority in their technical assistance programmes to the development of vocational, agricultural and technical education at all levels, especially at the intermediate level, and to the establishment of institutions for the training of vocational school teachers;
- (ii) to assist in the supply of equipment for workshops and laboratories and, especially, in organizing production centres in the training establishments;
- (iii) to assist Member States in the production of instructional material in the national languages for use in vocational institutions.

XIII. CONCERNING SCIENCE EDUCATION

1. *Recognizing* the strategic role of science education in the process of adapting education to the needs of rapid social and economic change;
2. *Considering* the place of science and mathematics in the over-all education of young people;
3. *Taking note* of the remarkable developments that have recently taken place in the teaching and learning of science and mathematics;
4. *Recommends* to Member States
 - (i) that each country prepare a detailed and phased plan for the expansion and reorganization of science education at all levels with the object of providing facilities for science teaching to all pupils during the first ten years of their schooling and of expanding facilities for science education and research in the universities;
 - (ii) that a national science education committee composed of scientists, teachers and representatives of industries and agriculture be formed to serve as a focal point for the effort to expand and strengthen science education;
 - (iii) that science and mathematics curricula, teaching methods, materials and the training of teachers be reorganized in line with the latest developments in the area;
 - (iv) that national centres for the promotion of science education be established to provide school-teachers with opportunities for experiments in science teaching; to design and produce inexpensive science equipment and other teaching aids; to provide advisory and technical assistance for the production of science textbooks and radio and television programmes where in existence; to publish guidebooks and journals in science education for the dissemination of up-to-date information; to conduct in-service training and organize conferences and seminars for science teachers;

(v) that experimental schools be attached to the national centres for promotion of science education. In these schools new curricula and teaching aids can be tried out before being introduced in all schools and such schools can serve as demonstration schools for the teaching of science;

(vi) that centres for scientific research be established in the universities;

5. *Invites* Unesco

- (i) to develop a major programme for the improvement of science education in the countries of the region;
- (ii) to assist Member States in designing modern curricula, textbooks and teaching materials;
- (iii) to assist in establishing national centres for the promotion of science and centres for scientific research;
- (iv) to organize, at regional level, high-level training programmes in modern methods and techniques of teaching science.

XIV. CONCERNING ASSISTANCE

1. *Having noted* with interest the account which has been submitted to it of the multilateral and bilateral assistance given to the countries of Asia;
2. *Considering* the substantial efforts which are still required and the need for an intensification of such aid;
3. *Considering* that these efforts should be pursued in the spirit of the Charter of the United Nations and in accord with that Organization's work of international co-operation;
4. *Recommends* that Unesco, together with the other United Nations organizations and their Member States, take steps to ensure that assistance to the developing countries, without political, economic or other conditions, is co-ordinated and conveyed in a spirit of international solidarity and genuine humanism;
5. *Having noted* with interest the work carried out by Unesco, in co-operation with ECAFE, in the preparation of the present conference and, in particular, of the draft Model for educational development in Asia;
6. *Considering* that the system of grouping Asian countries used in the draft Model represents a contribution to the study of stages of development;
7. *Convinced* that investigations of this kind, conducted in a practical way and with a view to action, not only provide an effective tool for assessing assistance needs and possibilities but also help, through integrated planning, to reduce the disparities between countries at different stages of development;
8. *Recommends* that Unesco and ECAFE, jointly and each within its field of competence, co-operate with Member States in order to ensure that studies of this nature be extended and intensified through an investigation of the social and economic aspects characteristic of the different stages of development, with the ultimate determination, if possible, of development and assistance coefficients;
9. *Convinced* that regional and international co-operation is vital for further educational development and the modernization of planning methods;
10. *Calls* for further co-operation between Unesco and ECAFE in the field of educational development in Asia;
11. *Invites* Unesco and other bilateral and multilateral agencies to help the countries of the region in their planning and project preparation, and through other technical services, with a view to their obtaining increased external financial assistance for achieving their educational targets;

12. *Recommends* further that, as far as practicable, greater flexibility be introduced into the administration of external financial assistance;
13. *Considering* that the World Bank and its affiliate, the International Development Association, is assisting in financing capital investment in educational projects for which external financial assistance is needed;
14. *Noting* with satisfaction that, at the regional level, the Inter-American Development Bank is also providing finance for

- education in Latin America, while in Africa the African Development Bank is currently considering making loans;
15. *Recommends* that Member States of the region take the necessary steps to invite the Asian Development Bank to consider financing high priority educational projects which contribute to the general development of their countries;
16. *Requests* Unesco to co-operate with the Asian Development Bank and give the necessary assistance in implementing this recommendation.



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